

LISTEN.
THINK.
SOLVE.™

COMPACT I/O

SELECTION GUIDE



1769 SERIES



I/O for Every Application



Rockwell Automation is the only company that can offer you the complete automation experience with world-class I/O products for virtually every application need. You can choose from I/O that is distributed with the application or integrated with the controller. The choice is yours.

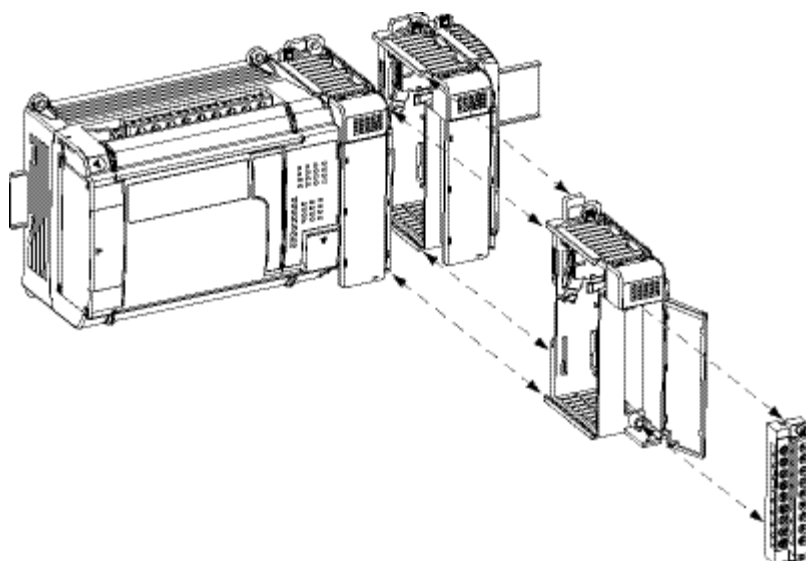
Rockwell Automation offers block I/O, modular I/O, and chassis-based I/O. This table summarizes our modular I/O selection. This selection guide summarizes the 1769 Compact I/O offering.

I/O Family	Description
1734 POINT I/O	<ul style="list-style-type: none"> • 1, 2, or 4 I/O per module • Compact modular assembly • Configure backplane size by plugging in bases/modules • Auto Device Replace (ADR) • Removable terminations
1794 FLEX I/O	<ul style="list-style-type: none"> • 4...32 I/O per module • More than 60 products to choose from • Easy configuration • Compact modular assembly • Configure backplane size by plugging in terminal bases/modules • Connect I/O directly - no separate terminal blocks required
1797 FLEX Ex I/O	<ul style="list-style-type: none"> • 2...16 I/O per module • Intrinsically Safe (IS) I/O for Class I, II, III, Div. 1 hazardous areas • Compact modular assembly • RIUP and advanced diagnostics • No need for IS barriers
1798 FLEXArmor I/O	<ul style="list-style-type: none"> • 4 or 8 I/O per module • Compact modular assembly • Machine-mountable; IP67 and NEMA 4X, 6P • Connect I/O directly with quick-disconnect connectors
1769 Compact I/O	<ul style="list-style-type: none"> • 2...32 I/O per module • Compact modular assembly • Configure backplane size by plugging in modules • Use for local I/O with a MicroLogix 1500 controller or a CompactLogix controller module

Compact I/O Modules





What's new:

- 1769-IF16C
- 1769-IF16C



- Once the modules are locked together, the system becomes a rugged assembly.
- Upper and lower tongue-and-groove slots guide the module during installation and secure the module within the system.
- Removable terminal blocks help ease the wiring task.
- Self-lifting, field-wire pressure plates cut installation time.
- The patented bus connector with locking function enables reliable module and system communication.
- A color bar is provided on the front of the module.
- Digital and field circuits are optically isolated.

The Compact I/O system offers low-cost per point, ease of acquisition, and flexible configuration and mounting options, providing an ideal solution for many industries. You can use the flexible 1769 Compact I/O system with several Allen-Bradley control systems.

System	Description
	<p>1768-L43 CompactLogix Controller</p> <p>Use Compact I/O modules as the primary I/O (local or networked expansion) for the controller. For more information, see the CompactLogix Selection Guide, publication 1768-SG001.</p>
	<p>1769 CompactLogix Controller</p> <p>Use Compact I/O modules as the primary I/O (local or networked expansion) for the controller. For more information, see the CompactLogix Selection Guide, publication 1769-SG001.</p>
	<p>1769-SDN DeviceNet Adapter Module</p> <p>Use Compact I/O modules as the primary I/O for the adapter (30 modules maximum). This allows the 1769 Compact I/O system to be used with a DeviceNet master.</p>
	<p>1764 MicroLogix 1500 Packaged Controller</p> <p>Use Compact I/O modules as modular expansion I/O (8 modules maximum) for the base I/O. You can have up to 16 modules when you use the MicroLogix 1500 series C processor with a series B base and RSLogix 500 software, version 5.0 or later. For more information, see the MicroLogix 1500 System Overview, publication 1764-SO001.</p>

Compact I/O Modules



The 1769 Compact I/O modules can be used with a CompactLogix controller, as well as for expansion I/O in a MicroLogix 1500 controller assembly or in an assembly with a 1769-ADN DeviceNet adapter module. Unless connected to a MicroLogix 1500 base, each bank of I/O modules must include its own power supply.

Install the I/O modules on a panel with two mounting screws or on a DIN rail. The modules mechanically lock together by means of a tongue-and-groove design and have an integrated communication bus that is connected from module to module by a moveable bus connector.

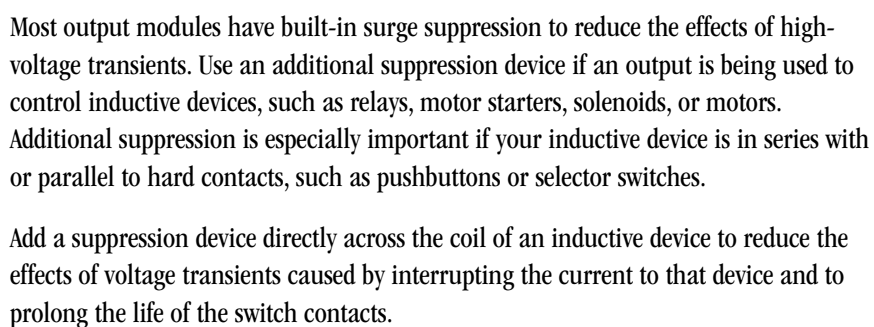
Each I/O module includes a built-in removable terminal block with finger-safe cover for connections to I/O sensors and actuators. The terminal block is behind a door at the front of the module. I/O wiring can be routed from beneath the module to the I/O terminals.

Topic	Page
Digital I/O modules	7
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Communication modules	64

About Power Supply Distance Ratings

Check each module's specification table for the power supply distance rating. This indicates how many slot positions the module can be from the power supply.

Type of Module	Description
Input	<p>An input module responds to an input signal in the following manner:</p> <ul style="list-style-type: none"> • Input filtering limits the effect of voltage transients caused by contact bounce and/or electrical noise. If not filtered, voltage transients could produce false data. All input modules use input filtering. • Optical isolation shields logic circuits from possible damage due to electrical transients. • Logic circuits process the signal. • An input LED indicator turns on or off indicating the status of the corresponding input device.
Output	<p>An output module controls the output signal in the following manner:</p> <ul style="list-style-type: none"> • Logic circuits determine the output status. • An output LED indicator displays the status of the output signal. • Optical isolation separates module logic and bus circuits from field power. • The output driver turns the corresponding output on or off.



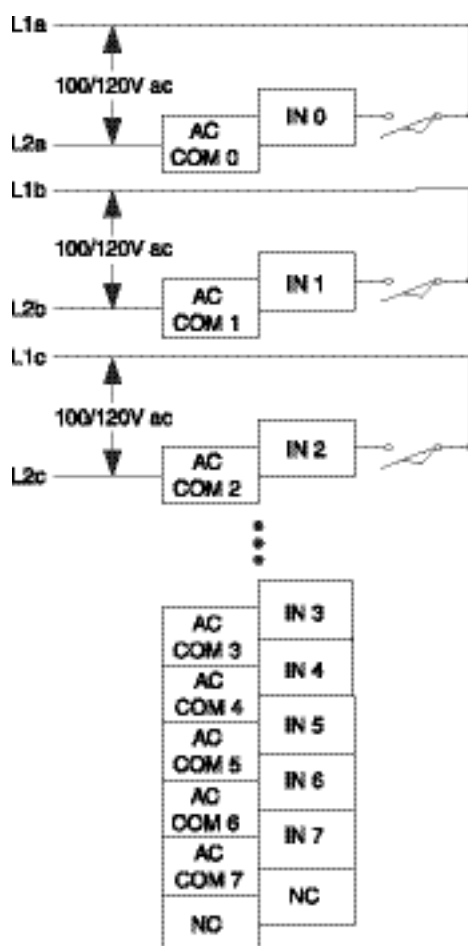
Selecting Digital I/O Modules

Voltage Category	Catalog Number	Input/Output	Page
AC			
100/120V AC	1769-IA8I	8 inputs, individually isolated	8
100/120V AC	1769-IA16	16 inputs	9
200/240V AC	1769-IM12	12 inputs	10
100...240V AC	1769-OA8	8 outputs	11
120...240V AC	1769-OA16	16 outputs	12
DC			
5V DC TTL input	1769-IG16	16 inputs	13
24V DC sinking/sourcing	1769-IQ16	16 inputs	14
	1769-IQ16F	16 inputs, high-speed	15
	1769-IQ32	32 inputs	16
	1769-IQ32T	32 inputs	17
24V DC sinking/sourcing input	1769-IQ6XOW4	6 inputs	18
AC/DC normally open relay output		4 outputs	
24V DC sourcing	1769-OB8	8 outputs	19
	1769-OB16	16 outputs	20
	1769-OB16P	16 outputs, protected	21
5V DC TTL output	1769-OG16	16 outputs	22
24V DC sourcing	1769-OB32	32 outputs	23
	1769-OB32T	32 outputs	24
24V DC sinking	1769-OV16	16 outputs	25
	1769-OV32T	32 outputs	26
AC/DC			
normally open relay	1769-OW8	8 outputs	27
	1769-OW8I	8 outputs, individually isolated	28
	1769-OW16	16 outputs	29

Certifications: C-UL (under CSA C22.2 No. 142), UL 508, CE

1769 Compact Digital AC Input Modules

1769-IA8I Isolated 120V AC Input Module

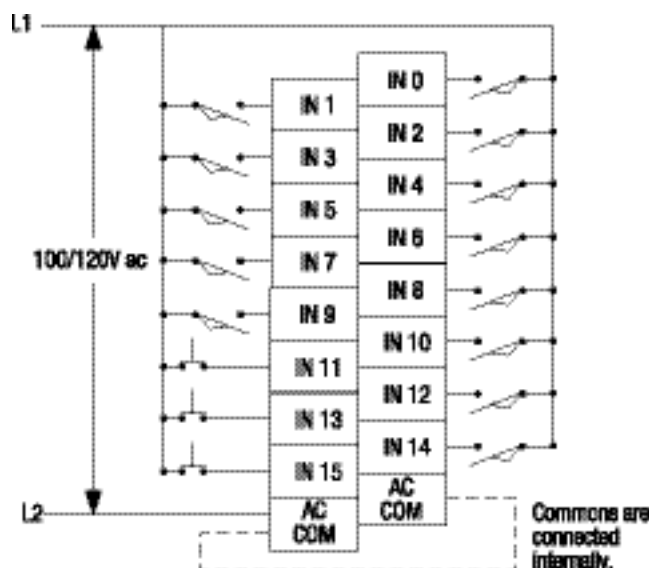


Attribute	Value
Voltage Category/Type, Input	100 or 120V AC
Voltage, On-State Input, Min.	79V AC
Voltage, On-State Input, Max.	132V AC
Operating Frequency Range	47...63 Hz
Number of Inputs	8
Backplane Current (mA) at 5V	90 mA*
Voltage, Off-State Input, Max.	20V AC
Current, Off-State Input, Max.	2.5 mA
Voltage, On-State Input, Min.	79V AC
Current, On-State Input, Min.	5 mA @ 79V AC
Inrush Current, Max.	250 mA*
Input Impedance, Nom.	12 k Ω @ 50 Hz 10 k Ω @ 60 Hz
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules
Isolated Groups	8 individually isolated inputs

*190 mA max.

*A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 k Ω (2.5 W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

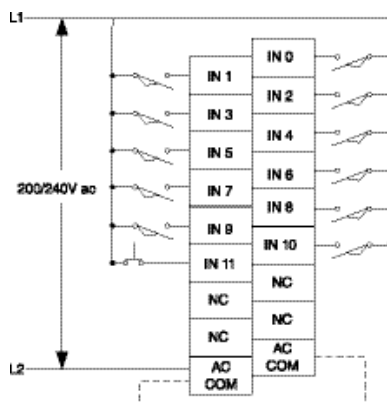
1769-IA16 120V AC Input Module



Attribute	Value
Voltage Category/Type, Input	100 or 120V AC
Voltage, On-State Input, Min.	132V AC
Voltage, On-State Input, Max.	132V AC
Operating Frequency Range	47...63 Hz
Number of Inputs	16
Backplane Current (mA) at 5V	115 mA
Voltage, Off-State Input, Max.	20V AC
Current, Off-State Input, Max.	2.5 mA
Voltage, On-State Input, Min.	79V AC
Current, On-State Input, Min.	5 mA @ 79V AC
Inrush Current, Max.	250 mA*
Input Impedance, Nom.	12 k Ω @ 50 Hz 10 k Ω @ 60 Hz
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0 to 15 (internally connected to common)

*A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 k Ω (2.5 W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

1769-IM12 240V AC Input Module

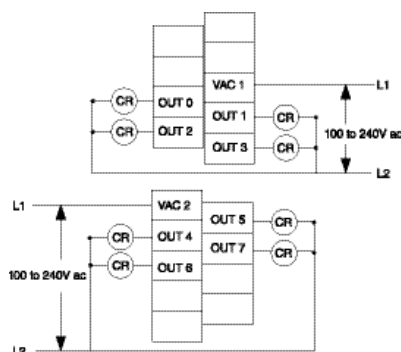


Attribute	Value
Voltage Category/Type, Input	200 or 240V AC
Voltage, On-State Input, Min.	159V AC
Voltage, On-State Input, Max.	265V AC
Operating Frequency Range	47...60 Hz
Number of Inputs	12
Backplane Current (mA) at 5V	100 mA
Voltage, Off-State Input, Max.	40V AC
Current, Off-State Input, Max.	2.5 mA
Voltage, On-State Input, Min.	159V AC
Current, On-State Input, Min.	5 mA @ 159V AC
Inrush Current, Max.	250 mA*
Input Impedance, Nom.	27 k Ω @ 50 Hz 23 k Ω @ 60 Hz
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: inputs 0 to 11 (internally connected commons)

*A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 15 k Ω (1.5W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration the minimum on-state voltage increases to 176V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

1769 Compact Digital AC Output Modules

1769-OA8 120/240V AC Output Module



Attribute	Value
Voltage Category/Type, Output	100...240V AC
Voltage, On-State Output, Min.	85V AC
Voltage, On-State Output, Max.	265V AC
Operating Frequency Range	47...63 Hz
Number of Outputs	8
Backplane Current (mA) at 5V	145 mA
Leakage Current, Off-State Output, Max	2.0 mA at 132V AC 2.5 mA at 265V AC*
Current, On-State Output, Min.	10.0 mA
Voltage Drop, On-State Output, Max.	1.5V AC at 0.5 A
Output Surge Current, Max.	10.0 A*‡
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7

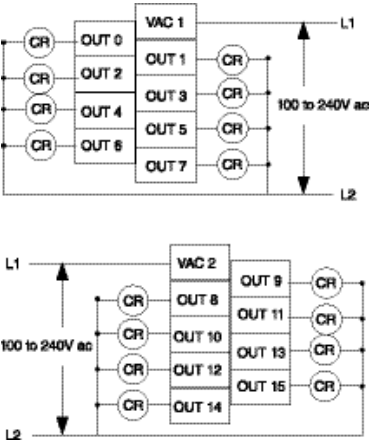
*Recommended Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V AC operation, use a 15 k Ω , 2W resistor. For 240V AC operation use a 15 k Ω , 5W resistor.

‡Repeatability is once every 2 seconds for a duration of 25 ms.

Surge Suppression - Connecting surge suppressors across your external load will extend the life of the Triac outputs. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

‡Surge Suppression - Connecting surge suppressors across your external load will extend the life of the Triac outputs. For additional details, refer to "Industrial Automation Wiring and Grounding Guidelines," Allen-Bradley publication 1770-4.1.

1769-OA16 120/240V AC Output Module



Attribute	Value
Voltage Category/Type, Output	100...240V AC
Voltage, On-State Output, Min.	85V AC
Voltage, On-State Output, Max.	265V AC
Operating Frequency Range	47...63 Hz
Number of Outputs	16
Backplane Current (mA) at 5V	225 mA
Leakage Current, Off-State Output, Max	2.0 mA at 132V AC 2.5 mA at 265V AC*
Current, On-State Output, Min.	10.0 mA
Voltage Drop, On-State Output, Max.	1.5V AC at 0.5A
Output Surge Current, Max.	10.0 A*‡
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0 to 7 Group 2: outputs 8 to 15

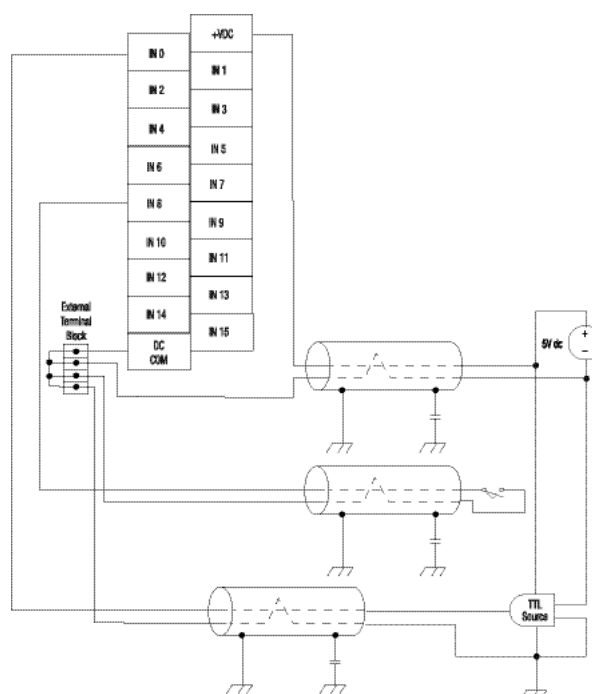
*Recommended Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V AC operation, use a 15 k Ω , 2W resistor. For 240V AC operation use a 15 k Ω , 5W resistor.

*Repeatability is once every 2 seconds for a duration of 25 ms.

‡Surge Suppression - Connecting surge suppressors across your external load will extend the life of the Triac outputs. For additional details, refer to "Industrial Automation Wiring and Grounding Guidelines," Allen-Bradley publication 1770-4.1.

1769 Compact Digital DC Input Modules

1769-IG16 TTL Input Module

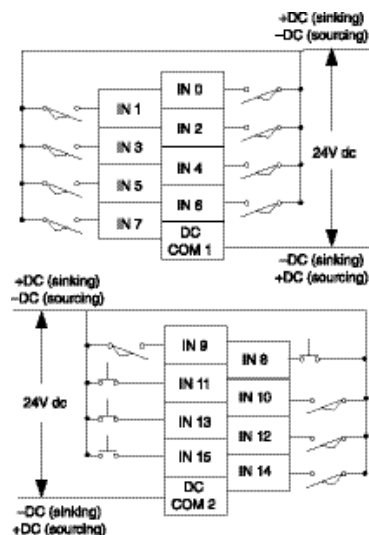


- General Notes**
1. Use Belden 2761, or equivalent, shielded wire.
 2. Do not connect more than 2 wires to any single terminal.
 3. DC power cable and I/O cables should not exceed 50 ft (15 m) in length.
 4. The capacitors shown above must be 0.01μF and rated for 2500 volts (minimum).
 4. User power supply must be rated Class 2 with a 5V dc range of 4.5V to 5.5V dc.

Attribute	Value
Voltage Category	5V DC TTL signal input
Operating Voltage Range	4.5...5.5V DC 50 mV peak-to-peak ripple, max
Number of Inputs	16
Backplane Current (mA) at 5V	120 mA
Heat Dissipation	1.6 Total Watts (The W per point, plus the min W, with all points energized.)
Digital Filter	Off to on: 0 s, 100 μs, 500 μs, 1 ms, 2 ms, 4 ms, 8 ms On to off: 0 s, 100 μs, 500 μs, 1 ms, 2 ms, 4 ms, 8 ms
Voltage, Off-State Input (typical)	2.0...5.5V DC*
Current, Off-State Input, Max.	4.1 mA
Voltage, On-State Input (typical)	-0.2...0.8V DC*
Input Current	3.7 mA @ 5V DC
Power Supply Distance Rating	8 modules
Input Point to Bus (CompactBus) Isolation	Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s 75V DC working voltage (IEC Class 2 reinforced insulation)

*TTL inputs are inverted (0.2...0.8V DC = logic low voltage = on; 2.0...5.5V DC = logic high voltage = off). Use a NOT instruction in the ladder program to convert to traditional true=high logic.

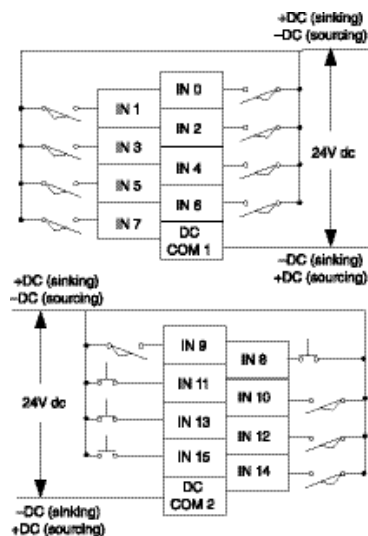
1769-IQ16 Current Sinking/Sourcing 24V DC Input Module



Attribute	Value
Voltage Category/Type, Input	24V DC, sinking or sourcing
Voltage, On-State Input, Min.	10V DC
Voltage, On-State Input, Max.	30V DC @ 30 °C (86 °F) 26.4V DC @ 60 °C (140 °F)
Number of Inputs	16
Backplane Current (mA) at 5V	115 mA
Input Delay Time, ON to OFF	8 ms
Input Delay Time, OFF to ON	8 ms
Voltage, Off-State Input, Max.	5V DC
Current, Off-State Input, Max.	1.5 mA
Voltage, On-State Input, Min.	10V DC
Current, On-State Input, Min.	2 mA
Inrush Current, Max.	250 mA
Input Impedance, Nom.	3 kΩ
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules*
Isolated Groups	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15

*The module may not be more than 8 modules away from the power supply or controller.

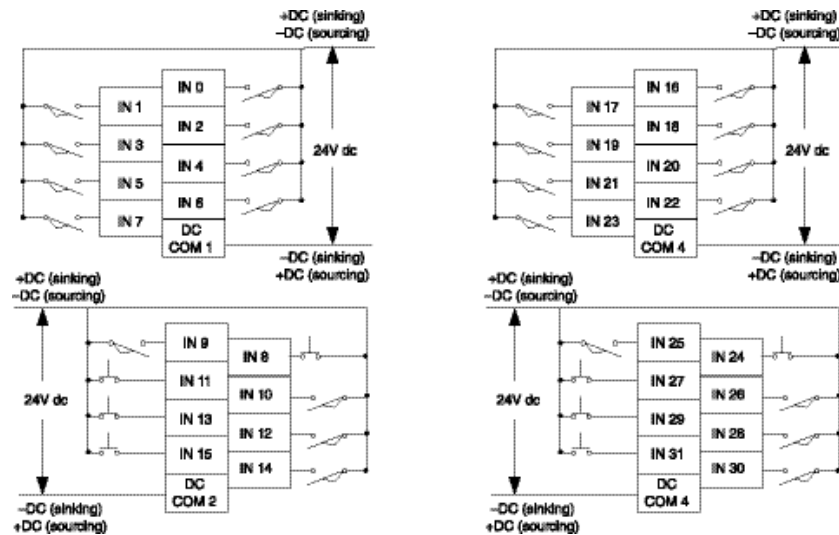
1769-IQ16F High-speed, Current Sinking/Sourcing 24V DC Input Module



Attribute	Value
Voltage Category/Type, Input	24V DC, sinking or sourcing
Voltage, On-State Input, Min.	10V DC
Voltage, On-State Input, Max.	30V DC @ 30 °C (86 °F) 26.4V DC @ 60 °C (140 °F)
Number of Inputs	16
Backplane Current (mA) at 5V	110 mA
Input Delay Time, ON to OFF	300 μ s
Input Delay Time, OFF to ON	1 ms
Voltage, Off-State Input, Max.	5V DC
Current, Off-State Input, Max.	1.5 mA
Voltage, On-State Input, Min.	10V DC
Current, On-State Input, Min.	2 mA
Inrush Current, Max.	250 mA
Input Impedance, Nom.	3 k Ω
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules*
Isolated Groups	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15

*The module may not be more than 8 modules away from the power supply or controller.

1769-IQ32 Current Sinking/Sourcing 24V DC Input Module

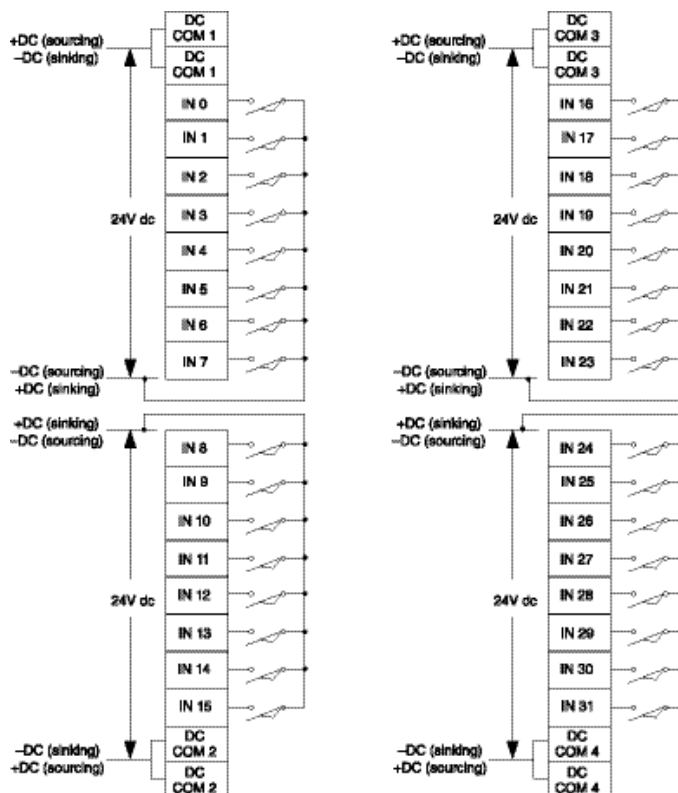


Attribute	Value
Voltage Category/Type, Input	24V DC, sinking or sourcing
Voltage, On-State Input, Min.	10V DC
Voltage, On-State Input, Max.	30V DC @ 30 °C (86 °F) 26.4V DC @ 60 °C (140 °F)
Number of Inputs	32
Backplane Current (mA) at 5V	170 mA
Input Delay Time, ON to OFF	8 ms
Input Delay Time, OFF to ON	8 ms
Voltage, Off-State Input, Max.	5V DC
Current, Off-State Input, Max.	1.5 mA
Voltage, On-State Input, Min.	10V DC
Current, On-State Input, Min.	2 mA
Inrush Current, Max.	250 mA
Input Impedance, Nom.	5.2 k Ω @ 24V DC 6.1 k Ω @ 30V DC
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 modules*
Isolated Groups	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15 Group 3: inputs 16 to 23 Group 4: inputs 24 to 31‡

*The module may not be more than 8 modules away from the power supply or controller.

‡Isolated groups operate in either sink or source configurations.

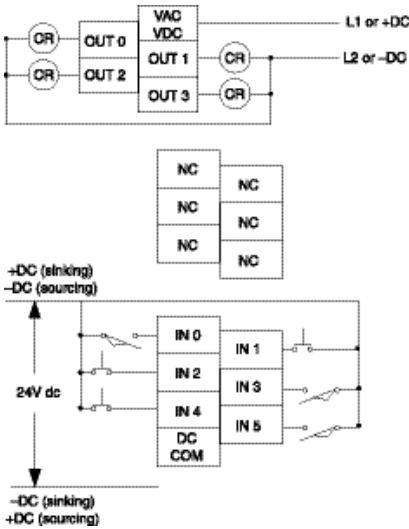
1769-IQ32T Current Sinking/Sourcing 24V DC Input Module



Attribute	Value
Voltage Category/Type, Input	24V DC, sinking or sourcing
Operating Voltage Range	20.4...26.4V DC
Number of Inputs	32
Backplane Current (mA) at 5V	170 mA
Input Delay Time, ON to OFF	8 ms*
Input Delay Time, OFF to ON	8 ms*
Voltage, Off-State Input, Max.	11V DC
Current, Off-State Input, Max.	1.7 mA
Voltage, On-State Input, Min.	19V DC
Current, On-State Input, Min.	3 mA
Inrush Current, Max.	5 mA
Input Impedance, Nom.	5.6 kΩ
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15 Group 3: inputs 16 to 23 Group 4: inputs 24 to 31

*Preliminary.

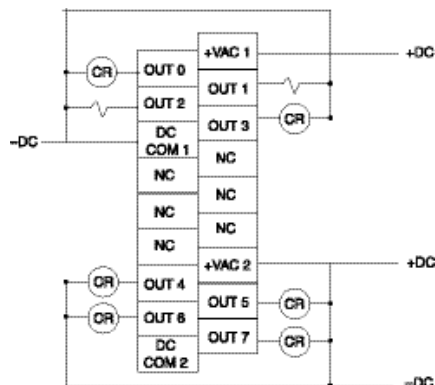
1769-IQ6XOW4 Combination Input/Output Module



Attribute	Value
Voltage Category/Type, Input	24V DC, sinking or sourcing
Voltage, On-State Input, Min.	10V DC
Voltage, On-State Input, Max.	30V DC @ 30 °C (86 °F) 26.4V DC @ 60 °C (140 °F)
Number of Inputs	6
Number of Outputs	4
Backplane Current (mA) at 5V	105 mA
Backplane Current (mA) at 24V	50 mA
Voltage, Off-State Input, Max.	5V DC
Current, Off-State Input, Max.	1.5 mA
Voltage, On-State Input, Min.	10V DC
Current, On-State Input, Min.	2 mA
Inrush Current, Max.	250 mA
Input Impedance, Nom.	3 kΩ
IEC Input Compatibility	Type 3
Output Delay Time, ON to OFF, Max.	10 ms
Output Delay Time, OFF to ON, Max.	10 ms
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: inputs 0...5 Group 2: outputs 0...3

1769 Compact Digital DC Output Modules

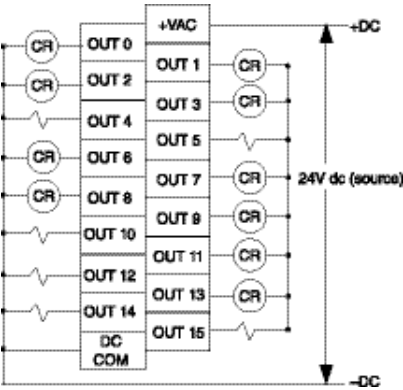
1769-OB8 Current Sourcing 24V DC Output Module



Attribute	Value
Voltage Category/Type, Output	24V DC, sourcing
Voltage, On-State Output, Min.	20.4V DC
Voltage, On-State Output, Max.	26.4V DC
Number of Outputs	8
Backplane Current (mA) at 5V	145 mA
Output Delay Time, OFF to ON	0.1 ms
Output Delay Time, ON to OFF	1.0 ms
Leakage Current, Off-State Output, Max.	1.0 mA @ 26.4V AC
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V DC @ 2 A
Output Surge Current, Max.	4.0 A
Power Supply Distance Rating	8 modules*
Isolated Groups	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7

*The module may not be more than this number of modules away from the power supply.

1769-OB16 Current Sourcing 24V DC Output Module



Attribute	Value
Voltage Category/Type, Output	24V DC, sourcing
Voltage, On-State Output, Min.	20.4V DC
Voltage, On-State Output, Max.	26.4V DC
Number of Outputs	16
Backplane Current (mA) at 5V	200 mA
Output Delay Time, OFF to ON	0.1 ms
Output Delay Time, ON to OFF	1.0 ms
Leakage Current, Off-State Output, Max	1.0 mA @ 26.4V AC*
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V AC @ 1.0 A
Output Surge Current, Max.	2.0 A*‡
Power Supply Distance Rating	8 modules§
Isolated Groups	Group 1: outputs 0 to 15 (internally connected to common)

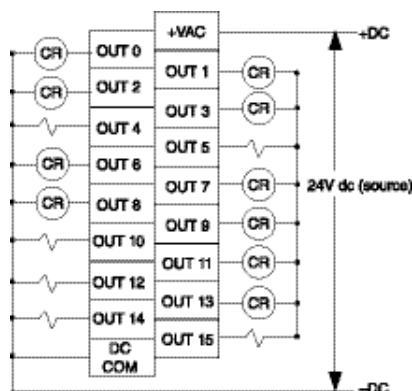
*Typical Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k Ω , 0.5 W resistor for transistor outputs, 24V DC operation.

‡Repeatability is once every 2 seconds for a duration of 10 ms.

‡Recommended Surge Suppression - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads. For additional details, refer to "Industrial Automation Wiring and Grounding Guidelines," Allen-Bradley publication 1770-4.1

§The module may not be more than this number of modules away from the power supply.

1769-OB16P Protected Current Sourcing 24V DC Output Module



Attribute	Value
Voltage Category/Type, Output	24V DC, sourcing
Voltage, On-State Output, Min.	20.4V DC
Voltage, On-State Output, Max.	26.4V DC
Number of Outputs	16
Backplane Current (mA) at 5V	160 mA*
Output Delay Time, OFF to ON	1.0 ms
Output Delay Time, ON to OFF	2.0 ms
Leakage Current, Off-State Output, Max	1.0 mA @ 26.4V AC‡
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	0.5V DC
Output Surge Current, Max.	2.0 A‡§
Power Supply Distance Rating	8 modules♣
Isolated Groups	Group 1: outputs 0 to 15 (internally connected to common)

*200 mA max.

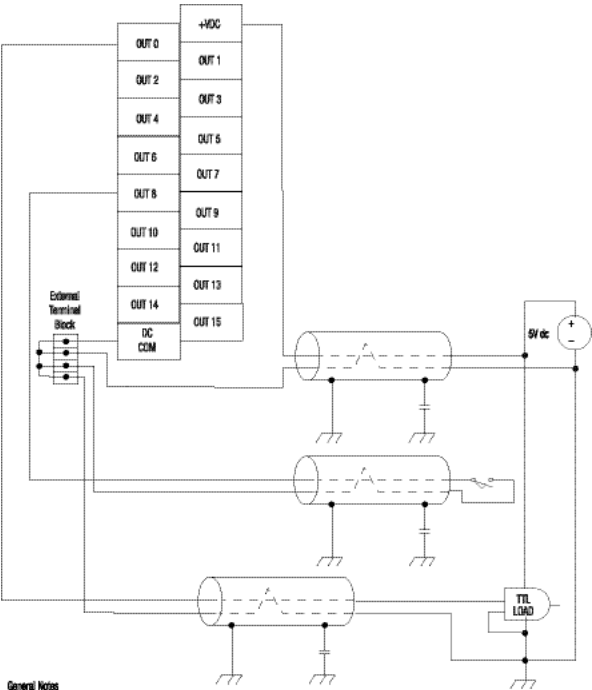
‡Typical Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k Ω , 0.5 W resistor for transistor outputs, 24V DC operation.

‡Repeatability is once every 2 seconds for a duration of 10 ms.

§Recommended Surge Suppression - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads. For additional details, refer to "Industrial Automation Wiring and Grounding Guidelines," Allen-Bradley publication 1770-4.1.

♣ The module may not be more than this number of modules away from the power supply.

1769-OG16 TTL Output Module

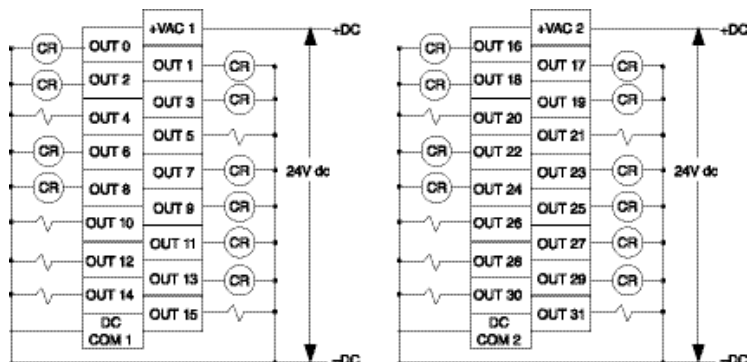


- General Notes
- 1. Use Belden 2761, or equivalent, shielded wire.
 - 2. Do not connect more than 2 wires to any single terminal.
 - 3. DC power cable and I/O cables should not exceed 30 ft (10 m) in length.
 - 4. The capacitors shown above must be 0.01µF and rated for 2500 volts (minimum).
 - 5. Use power supply must be rated Class 2 with a 5V dc range of 4.5V to 5.5V dc.

Attribute	Value
Voltage Category	5V DC TTL signal output
Operating Voltage Range	4.5...5.5V DC 50 mV peak-to-peak ripple, max
Number of Outputs	16
Backplane Current (mA) at 5V	200 mA
Heat Dissipation	1.2 Total Watts (The W per point plus the min W, with all points energized.)
Signal On Delay, Max (resistive load)	0.25
Signal Off Delay, Max (resistive load)	0.50
Voltage, Off-State Input (typical)	4.5...5.5V DC*
Voltage, On-State Output, Max.	0...0.4V DC
Current, On-State Output, Min.	0.15 mA
Output Continuous Current per Point, Max.	24 mA
Power Supply Distance Rating	8 modules
Output Point to Bus (CompactBus) Isolation	Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s 75V DC working voltage (IEC Class 2 reinforced insulation)

*TTL outputs are inverted (on = 1 = logic low voltage = 0...0.4V DC; off = 0 = logic high voltage = 4.5...5.5V DC). Use a NOT instruction in the ladder program to convert to traditional true=high logic.

1769-OB32 Current Sourcing 24V DC Output Module*



Attribute	Value
Voltage Category/Type, Output	24V DC, sourcing*
Voltage, On-State Output, Min.	20.4V DC
Voltage, On-State Output, Max.	26.4V DC
Number of Outputs	32
Backplane Current (mA) at 5V	300 mA
Output Delay Time, OFF to ON	0.1 ms
Output Delay Time, ON to OFF	1.0 ms
Leakage Current, Off-State Output, Max	1.0 mA @ 26.4V AC‡
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V DC @ 1.0 A
Output Surge Current, Max.	2.0 A (Repeatable once every 2 s for a duration of 10 ms.)‡
Power Supply Distance Rating	6 modules§
Isolated Groups	Group 1: outputs 0 to 15 (internally connected to DC COM 1) Group 2: outputs 16 to 31 (internally connected to DC COM 2)

*Sourcing Output - Source describes the current flow between the I/O module and the field device. Sourcing output circuits supply (source) current to sinking field devices. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices. Europe: DC sinking input and sourcing output module circuits are the commonly used options.

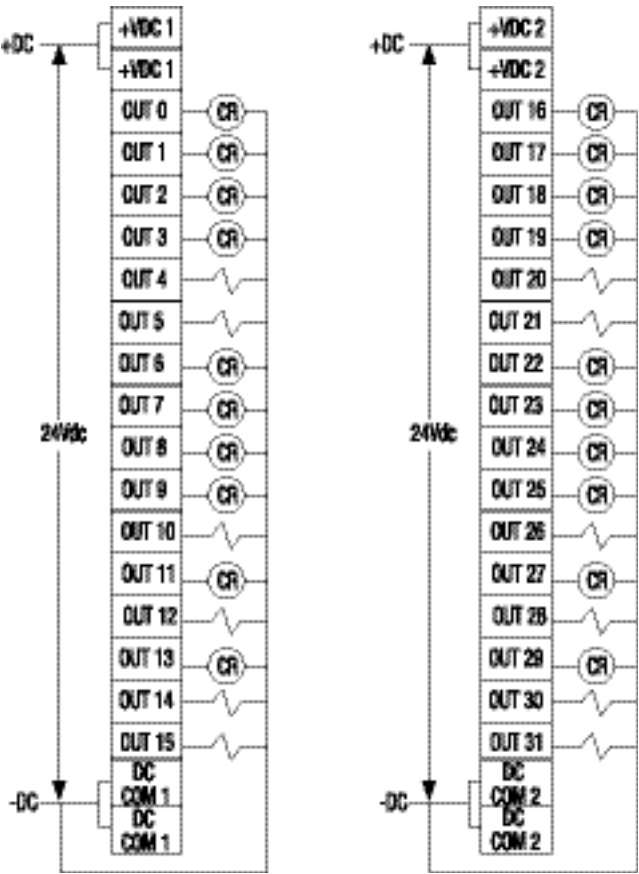
‡Typical Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6K ohm, ½ watt resistor for transistor outputs, 24V DC operation.

‡Recommended Surge Suppression - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

§The module may not be more than this number of modules away from the power supply.

*The 1769-OB32 module is a 1.5-slot wide module.

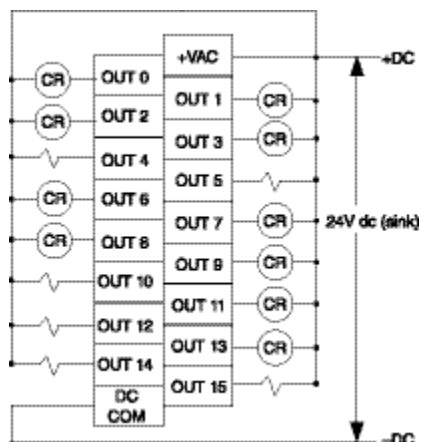
1769-OB32T Current Solid-state Sourcing 24V DC Output Module*



Attribute	Value
Voltage Category/Type, Output	24V DC, sourcing
Operating Voltage Range	10.2V DC...26.4V DC
Number of Outputs	32
Backplane Current (mA) at 5V	220 mA (1.10 W) mA
Heat Dissipation	4.76 Total W (The W per point, plus the min W, with all points energized.)
Signal On Delay, Max (resistive load)	0.5
Signal Off Delay, Max (resistive load)	4.0
Leakage Current, Off-State Output, Max	0.1 mA @ 26.4V DC
Continuous Current, Max	0.5 A per point 2.0 A per common 4.0 A per module
Voltage Drop, On-State Output, Max.	0.3V DC @ 0.5 A
Output Surge Current, Max.	2.0 A (repeatability is once every 2 s for a duration of 10 ms)
Power Supply Distance Rating	8 modules
Output Point to Bus Isolation	Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s 75V DC working voltage (IEC Class 2 reinforced insulation)
Isolated Groups	Group 1: outputs 0...15 (internally connected to DC COM 1) Group 2: outputs 16...31 (internally connected to DC COM 2)

*The 1769-OB32T module is a 1.5-slot wide module.

1769-OV16 Current Sinking 24V DC Output Module



Attribute	Value
Voltage Category/Type, Output	24V DC, sinking
Voltage, On-State Output, Min.	20.4V DC
Voltage, On-State Output, Max.	26.4V DC
Number of Outputs	16
Backplane Current (mA) at 5V	200 mA
Output Delay Time, OFF to ON	0.1 ms
Output Delay Time, ON to OFF	1.0 ms
Leakage Current, Off-State Output, Max	1.0 mA @ 26.4V AC*
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V AC @ 1.0 A
Output Surge Current, Max.	2.0 A*‡
Power Supply Distance Rating	8 modules§
Isolated Groups	Group 1: outputs 0 to 15 (internally connected to common)

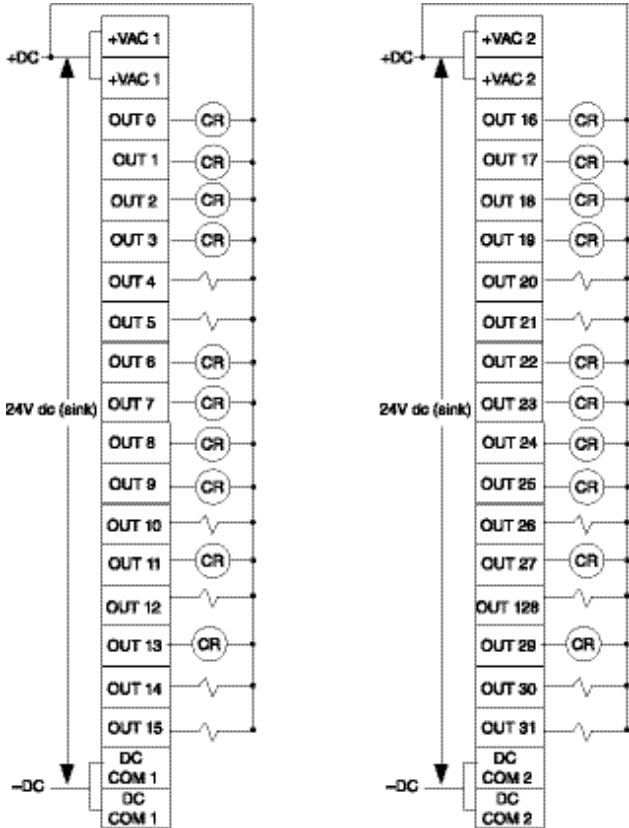
*Typical Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k Ω , 0.5 W resistor for transistor outputs, 24V DC operation.

‡Repeatability is once every 2 seconds for a duration of 10 ms.

‡Recommended Surge Suppression - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads. For additional details, refer to "Industrial Automation Wiring and Grounding Guidelines," Allen-Bradley publication 1770-4.1.

§The module may not be more than this number of modules away from the power supply.

1769-OV32T Current Sinking 24V DC Output Module



Attribute	Value
Voltage Category/Type, Output	24V DC, sinking
Operating Voltage Range	10.2...26.4V DC
Number of Outputs	32
Backplane Current (mA) at 5V	220 mA
Output Delay Time, OFF to ON	0.5 ms
Output Delay Time, ON to OFF	4.0 ms
Leakage Current, Off-State Output, Max	0.1 mA @ 26.4V AC
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V DC @ 1 A
Output Surge Current, Max.	1.0 A*
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0...15 (internally connected to DC COM 1) Group 2: outputs 16...31 (internally connected to DC COM 2)

*Preliminary.

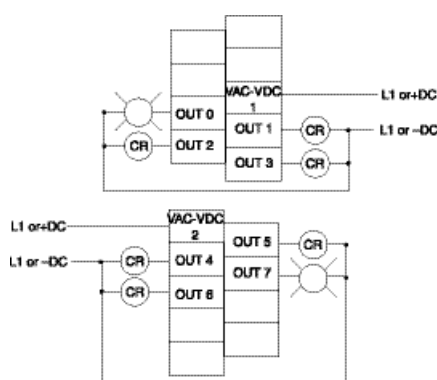
1769 Compact Digital Contact Output Modules

These ratings apply to the digital contact output modules.

Volts, Max.	Continuous Amps per Point	Amperes		Voltamperes		IEC 947	NEMA ICS 2-125	
		Make	Break	Make	Break			
240V AC	2.5 A	7.5 A	0.75 A	1800 VA	180 VA	AC15*	C300	
120V AC		15 A	1.5 A					
125V DC	1.0 A	0.22 A		28 VA		DC13*	R150	
24V DC	2.0 A	1.2 A		28 VA		—	—	

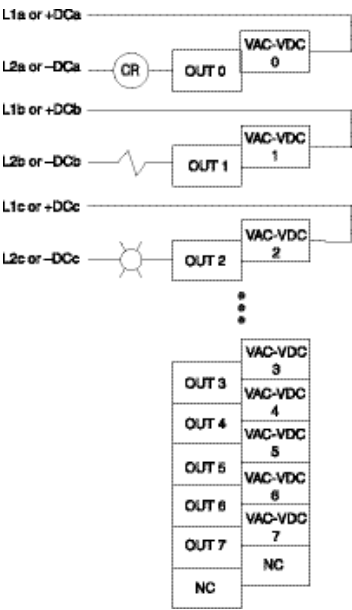
*Does not apply to the 1769-OW16 module.

1769-OW8 AC/DC Relay Output Module



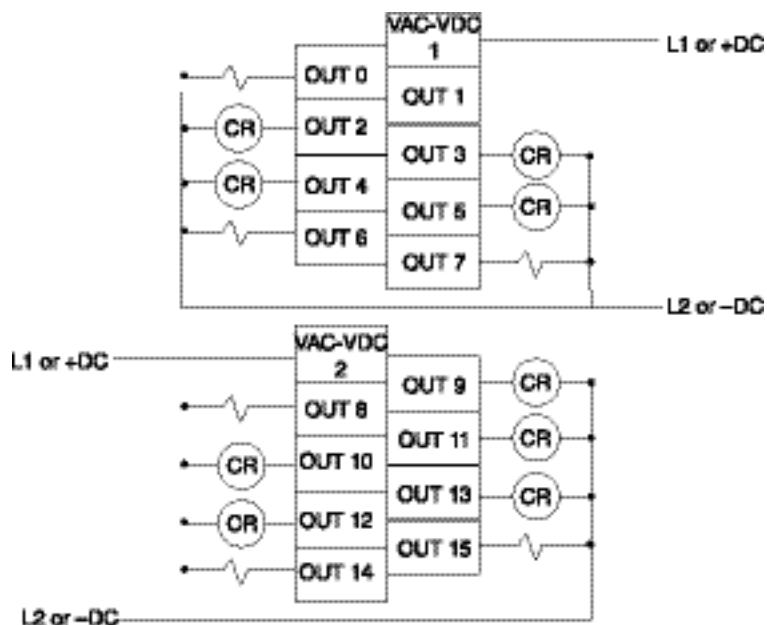
Attribute	Value
Voltage Category/Type, Output	AC/DC normally open relay
Voltage, On-State Output, Min.	5V AC/5V DC
Voltage, On-State Output, Max.	265V AC/125V DC
Number of Outputs	8
Backplane Current (mA) at 5V	125 mA
Backplane Current (mA) at 24V	100 mA
Output Delay Time, OFF to ON	10 ms10 ms
Output Delay Time, ON to OFF	10 ms
Leakage Current, Off-State Output, Max	0 mA
Current, On-State Output, Min.	10 mA at 5V DC
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7

1769-OW8I Isolated AC/DC Relay Output Module



Attribute	Value
Voltage Category/Type, Output	AC/DC Relay
Voltage, On-State Output, Min.	5V AC/5V DC
Voltage, On-State Output, Max.	265V AC/125V DC
Number of Outputs	8
Backplane Current (mA) at 5V	125 mA
Backplane Current (mA) at 24V	100 mA
Output Delay Time, OFF to ON	10 ms
Output Delay Time, ON to OFF	10 ms
Leakage Current, Off-State Output, Max	0 mA
Current, On-State Output, Min.	10 mA at 5V DC
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7

1769-OW16 AC/DC Relay Output Module



Attribute	Value
Voltage Category/Type, Output	AC/DC Relay
Voltage, On-State Output, Min.	5V AC/5V DC
Voltage, On-State Output, Max.	265V AC/125V DC
Number of Outputs	16
Backplane Current (mA) at 5V	205 mA
Backplane Current (mA) at 24V	180 mA
Output Delay Time, ON to OFF, Max.	10 ms (resistive load)
Output Delay Time, OFF to ON, Max.	10 ms (resistive load)
Leakage Current, Off-State Output, Max	0 mA
Current, On-State Output, Min.	10 mA @ 5V DC
Power Supply Distance Rating	8 modules
Isolated Groups	Group 1: outputs 0...7 Group 2: outputs 8...15

Analog I/O Modules

Choose analog, thermocouple, or RTD modules when you need these features:

- Individually configurable channels
- Ability to individually enable and disable channels
- On-board scaling
- Autocalibration of inputs
- Online configuration
- Selectable input filters
- Over-range and under-range detection and indication
- Selectable response to a broken input sensor
- Selectable power source
- Input modules offer both single-ended or differential inputs
- Ability to direct output device operation during an abnormal condition
- High accuracy ratings

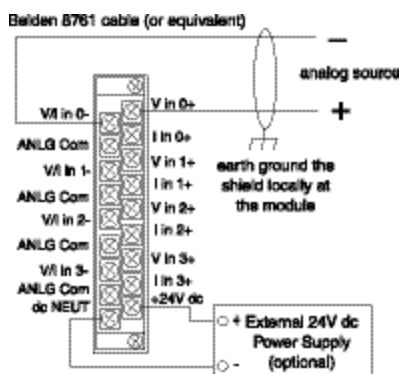
Selecting Analog Modules

Cat. No.	Number of Inputs Number of Outputs	Description	Page
1769-IF4	4 inputs	Analog input	31
1769-IF4I	4 inputs	Isolated analog input	33
1769-IF8	8 inputs	Analog input	35
1769-IF16C	16 inputs, current	Analog input, high-density	37
1769-IF16V	16 inputs, voltage	Analog input, high-density	38
1769-OF2	2 outputs	Analog output	39
1769-OF4CI	4 outputs, current	Isolated analog output	40
1769-OF8C	8 outputs, current	Analog output	41
1769-OF4VI	4 outputs, voltage	Isolated analog output	42
1769-OF8V	8 outputs, voltage	Analog output	43
1769-IF4XOF2	4 inputs 2 outputs	Analog combination input and output	44
1769-IT6	6 inputs	Thermocouple input	47
1769-IR6	6 inputs	RTD input	51

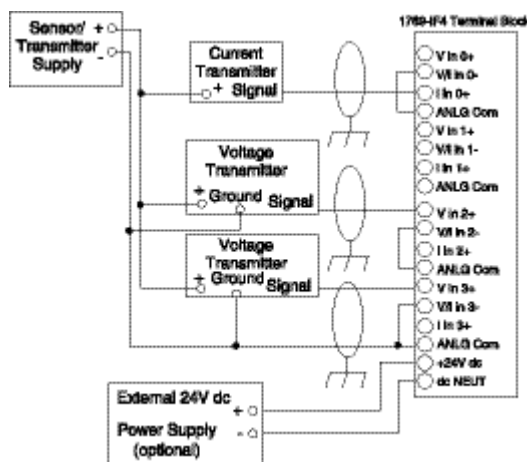
Certifications: C-UL (under CSA C22.2 No. 142), UL 508, CE, C-Tick

1769-IF4 Analog Input Module

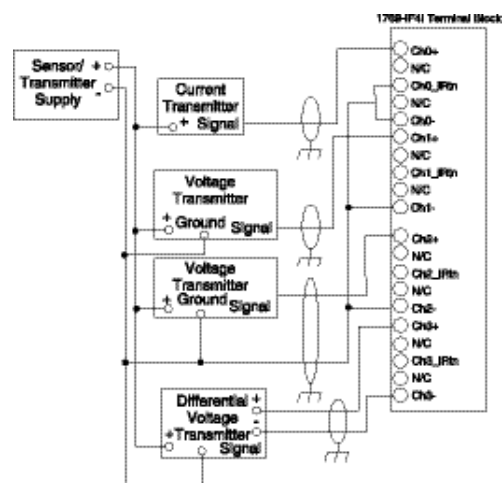
Wiring Differential Inputs



Wiring Single-ended Sensor/Transmitter Inputs



Wiring Mixed Transmitter Inputs



1769-IF4 Specifications

The external power supply must be rated Class 2, with a 24V DC range of 20.4...26.4V DC and 60 mA minimum.

Series B and later modules provide this option.

Attribute	Value
Voltage Category/Type, Input	±10.5V DC -0.5...10.5V DC -0.5...5.25V DC 0.5...5.25V DC
Current Range, Analog Input	0...21 mA or 3.2...21 mA, full-scale*
Number of Inputs	4
Backplane Current (mA) at 5V	105 mA
Backplane Current (mA) at 24V	60 mA‡
Input Resolution, Bits	14 bits (unipolar)‡
Normal Mode Rejection Ratio	-50 dB at 50 and 60 Hz with the 50 or 60 Hz filter selected, respectively.
Input Impedance	Current Input: 250 Ω Voltage Input: 220 Ω
Accuracy Drift w/Temp., Analog Inputs	Current Input: ±0.0045%/°C Voltage Input: ±0.003%/°C
Non-linearity, Input	±0.03% full scale
Repeatability, Input	±0.03%§
Module Error over Full Temperature Range	±0.03% - Voltage ±0.05% - Current
Input Channel Configuration	Configuration via configuration software screen or the user program (by writing a unique bit pattern into the module's configuration file). Refer to your controller's user manual to determine if user program configuration is supported.
Calibration	The module performs autocalibration on channel enable and on a configuration change between channels.
Diagnostics Type	Over- or under-range by bit reporting
Power Supply Distance Rating	8 modules♣
Isolation Voltage	500V AC or 710V DC for 1 minute, 30V AC/30VDC working voltage (IEC Class 2 reinforced insulation), input group to bus

*The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

‡If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

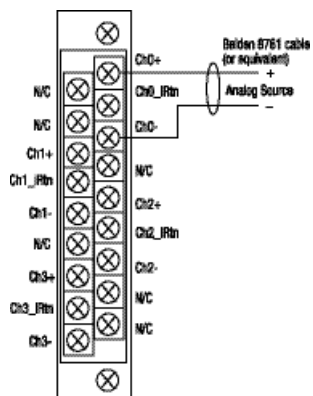
‡Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected. For resolution with other filter selections, refer to the user manual, publication 1769-UM002.

§Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

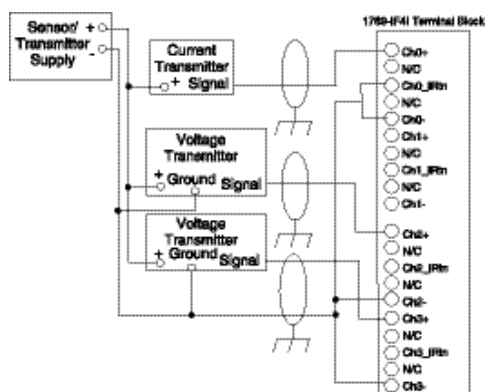
♣The module may not be more than 8 modules away from the system power supply.

1769-IF4I Isolated Analog Input Module

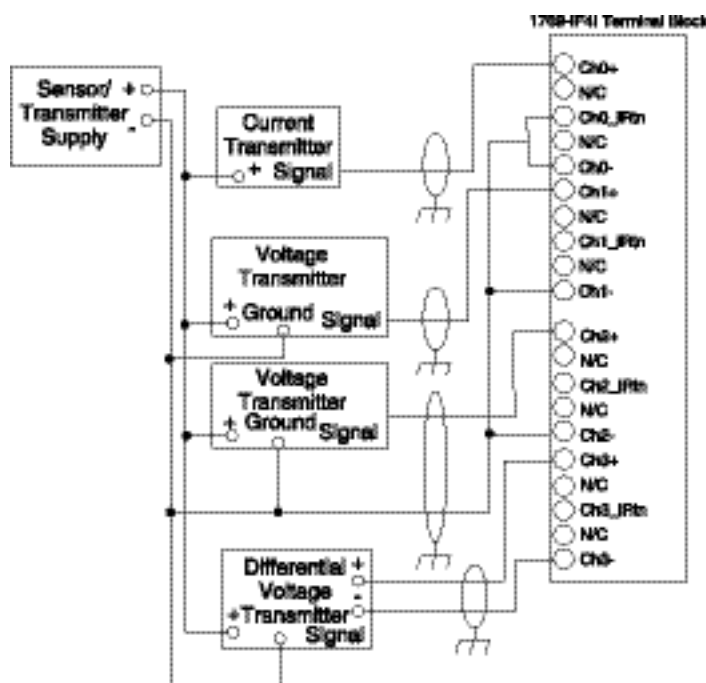
Wiring Differential Inputs



Wiring Single-ended Sensor/Transmitter Inputs



Wiring Mixed Transmitter Inputs



1769-IF4I Specifications

Attribute	Value
Voltage Category/Type, Input	±10.5V DC 0...10.5V DC 0...5.25V DC 0.5...5.25V DC
Current Range, Analog Input	0...21 mA or 3.2...21 mA, full-scale*
Number of Inputs	4
Backplane Current (mA) at 5V	145 mA
Backplane Current (mA) at 24V	125 mA
Input Resolution, Bits	14 bits (unipolar)*
Normal Mode Rejection Ratio	-50 dB at 50 and 60 Hz with the 10 Hz filter selected, respectively.
Input Impedance	Current Input: 249 Ω Voltage Input: 1M Ω
Accuracy Drift w/Temp., Analog Inputs	Current Input: ±0.0045%/°C Voltage Input: ±0.003%/°C
Non-linearity, Input	±0.03% full scale
Repeatability, Input	±0.03%‡
Module Error over Full Temperature Range	±0.03% - Voltage ±0.05% - Current
Input Channel Configuration	Configuration via configuration software screen or the user program (by writing a unique bit pattern into the module's configuration file). Refer to your controller's user manual to determine if user program configuration is supported.
Calibration	The module performs only initial factory calibration.
Diagnostics Type	Over- or under-range by bit reporting, process alarms
Power Supply Distance Rating	8 modules§
Isolation Voltage	500V AC or 710V DC for 1 minute, 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), input group to bus

*The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

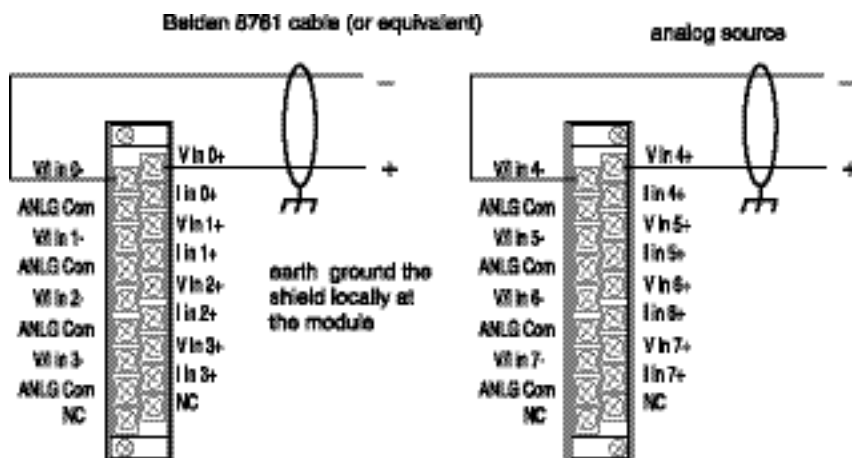
*Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected. For resolution with other filter selections, refer to the user manual, publication 1769-UM002.

‡Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

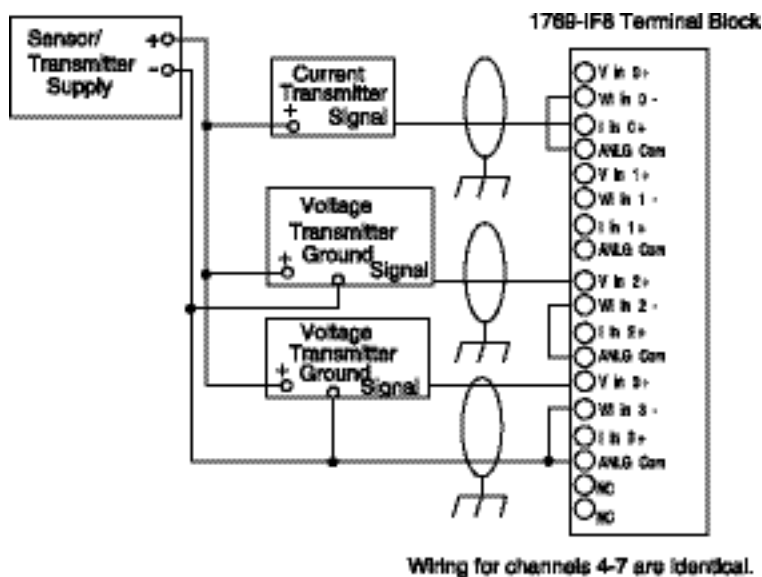
§The module may not be more than 8 modules away from the system power supply.

1769-IF8 Analog Input Module

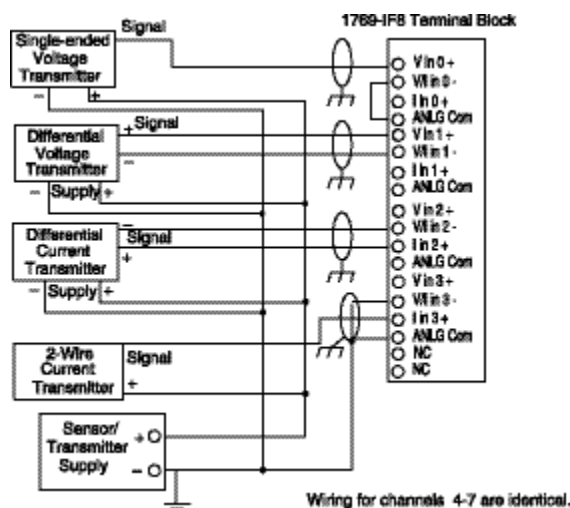
Wiring Differential Inputs



Wiring Single-ended Sensor/Transmitter Inputs



Wiring Mixed Transmitter Inputs



1769-IF8 Specifications

Attribute	Value
Voltage Category/Type, Input	±10V DC (±10.5V DC full scale) 0...10V DC (-0.5...10.5V DC full scale) 0...5V DC (-0.5...5.25V DC full scale) 1...5V DC (0.5...5.25V full scale)*
Current Range, Analog Input	0...20 mA or 4...20 mA, full-scale‡
Number of Inputs	8
Backplane Current (mA) at 5V	120 mA
Backplane Current (mA) at 24V	70 mA
Input Resolution	16 bits (unipolar) 15 bits + sign (bipolar)
Normal Mode Rejection Ratio	-50 dB at 50 and 60 Hz with the 10 Hz filter selected, respectively
Input Impedance	Current Input: 250 Ω Voltage Input: 220 Ω
Accuracy Drift w/Temp.	Current Input: ±0.0045%/°C Voltage Input: ±0.003%/°C
Non-linearity, Input	±0.03%
Input Repeatability	±0.03%‡
Module Error over Full Temperature Range	±0.03% - Voltage ±0.05% - Current
Input Channel Configuration	Via configuration software screen or the user program (by writing a unique bit pattern into the module's configuration file). Refer to your controller's user manual to determine if user program configuration is supported.
Calibration	The module performs autocalibration on channel enable and on a configuration change between channels
Diagnostics Type	Over- or under-range by bit reporting, process alarms
Power Supply Distance Rating	8 modules§
Isolation Voltage	500V AC or 710V DC for 1 min (qualification test), 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), input group to bus

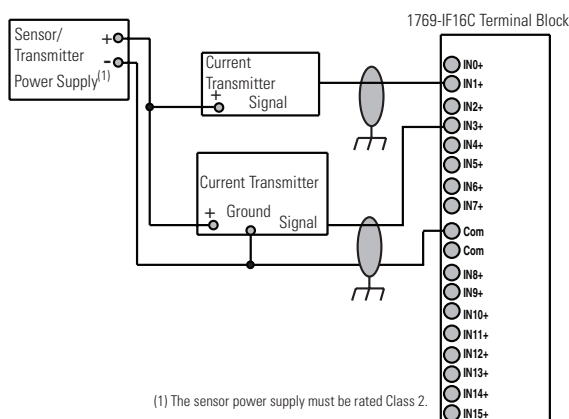
*The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

‡The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the max full scale range. The flag automatically resets when within the normal operating range.

‡Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

§The module may not be more than 8 modules away from the system power supply.

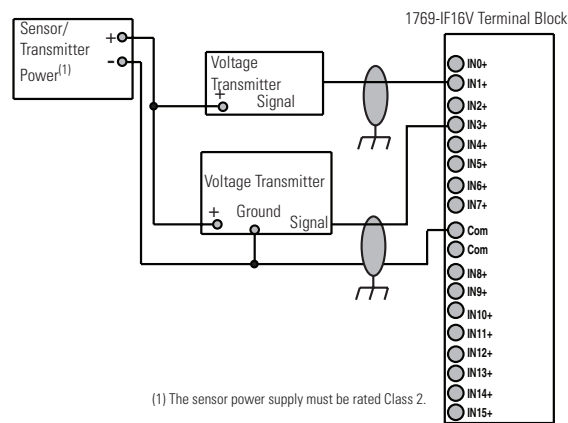
1769-IF16 High-density Current Analog Input Module



1769-IF16C Specifications

Attribute	Value
Voltage Category/Type, Input	—
Current Range, Analog Input	0...20 mA 4...20 mA
Number of Inputs	16 single-ended
Backplane Current @ 5V	190 mA
Backplane Current @ 24V	70 mA
Input Resolution	16 bits (unipolar) 15 bits + sign (bipolar)
Input Impedance	249 Ω
Accuracy Drift w/Temp.	$\pm 0.0045\%$ per $^{\circ}\text{C}$
Non-linearity, Input	$\pm 0.03\%$ full scale
Input Repeatability	$\pm 0.03\%$ for 16 Hz filter
Module Error over Full Temperature Range	1.25% for 16 Hz filter
Calibration	None required
Diagnostics Type	Over- or under-range by bit reporting, process alarms, per channel
Power Supply Distance Rating	8 modules
Isolation Voltage	Input group to bus 500V AC or 710V DC for 1 minute (qualification test) 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)

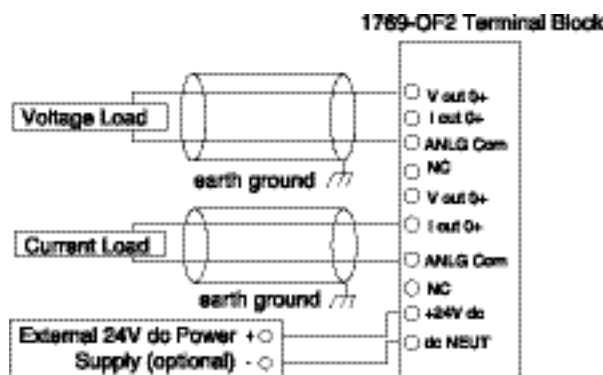
1769-IF16 High-density Voltage Analog Input Module



1769-IF16V Specifications

Attribute	Value
Voltage Category/Type, Input	±10V DC 0...10V DC 0...5V DC 1...5V DC
Current Range, Analog Input	—
Number of Inputs	16 single-ended
Backplane Current @ 5V	190 mA
Backplane Current @ 24V	70 mA
Input Resolution	16 bits (unipolar) 15 bits + sign (bipolar)
Input Impedance	>1 MΩ (typical)
Accuracy Drift w/Temp.	±0.003% per °C
Non-linearity, Input	±0.03% full scale
Input Repeatability	±0.06% for 16 Hz filter
Module Error over Full Temperature Range	1.0% for 16 Hz, 50 Hz, and 60 Hz filters
Calibration	None required
Diagnostics Type	Over- or under-range by bit reporting, process alarms, per channel
Power Supply Distance Rating	8 modules
Isolation Voltage	Input group to bus 500V AC or 710V DC for 1 minute (qualification test) 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)

1769-OF2 Analog Output Module



Attribute	Value
Voltage Category/Type, Output	±10.5V DC -0.5...10.5V DC -0.5...5.25V DC 0.5...5.25V DC
Current Range, Analog Output	0...20 mA or 4...20 mA 0...21 mA or 3.2...21 mA, full-scale
Number of Outputs	2
Backplane Current (mA) at 5V	120 mA
Backplane Current (mA) at 24V	120 mA*
Output Resolution, Bits	14 bits (unipolar); 14 bits plus sign (bipolar) ±10V DC: Sign + 14 bits, 0.64 mV 0 to +5V DC: Sign + 13 bits, 0.64 mV 0 to +10V DC: Sign + 14 bits, 0.64 mV +4 to +20 mA: Sign + 14 bits, 1.28 µA +1 to +5V DC: Sign + 13 bits, 0.64 mV 0 to +20 mA: Sign + 14 bits, 1.28 µA
Conversion Type, Outputs	Sigma-Delta
Step Response to 63% of FS, Voltage Output	2.9 ms*
Step Response to 63% of FS, Current Output	2.9 ms*
Current Load on Voltage Output, Max.	10 mA
Resistive Load on Current Output	0...500 Ω‡
Load Range, Voltage Output	>1 kΩ at 10V DC
Inductive Load	0.1 mH
Output Capacitance	1 µF
Calibration	None required
Accuracy Drift w/Temp., Analog Outputs	Current Output: ±0.0058% Full Scale/°C Voltage Output: ±0.0086% Full Scale/°C
Non-linearity, Output	±0.05% full scale
Repeatability, Output	±0.05%§
Module Error over Full Temperature Range	±0.8% - Voltage ±0.55% - Current
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Overvoltage Protection	Yes
Diagnostics Type	Over- or under-range by bit reporting Output wire broken or load resistance high by bit reporting (current mode only)
Power Supply Distance Rating	8 modules
Isolation Voltage	500V AC or 710V DC for 1 minute (qualification test), 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), output group to bus

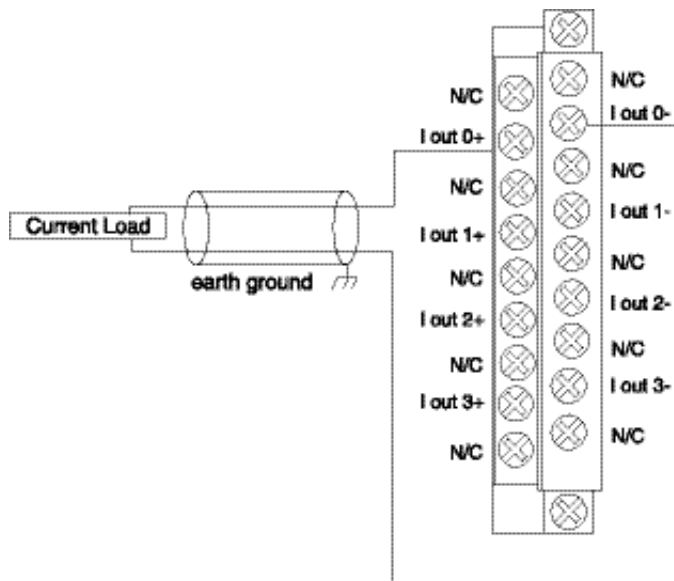
*If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

‡Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

‡Includes wire resistance.

§Repeatability is the ability of the output module to reproduce output readings when the same controller value is applied to it consecutively, under the same conditions and in the same direction.

1769-OF4CI Isolated Analog Current Output Module



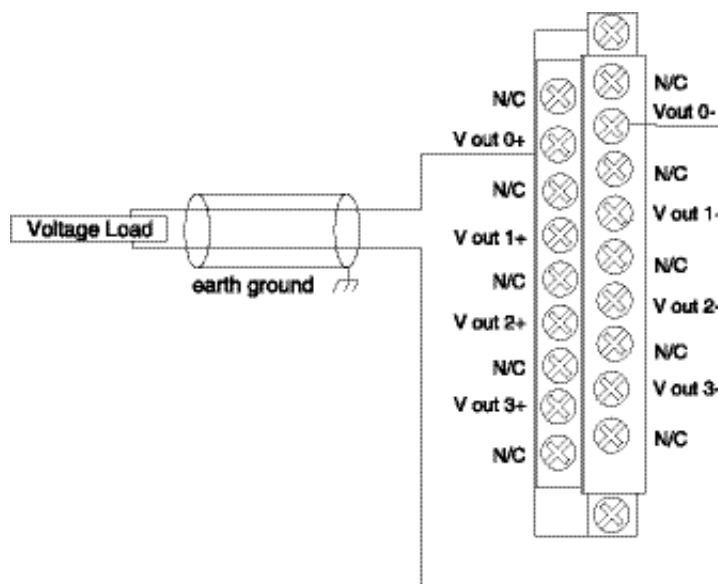
Attribute	Value
Current Range, Analog Output	0...20 mA, 4...20 mA 0...21 mA, 3.2...21 mA full scale*
Number of Outputs	4
Backplane Current (mA) at 5V	145 mA
Backplane Current (mA) at 24V	140 mA
Output Resolution	16 bits (unipolar) +4...+20 mA: 15.59 bits, 0.324 μ A/bit 0...+20 mA: 15.91 bits, 0.324 μ A/bit
Output Conversion Rate	10 ms
Step Response to 63% of FS, Output	Current Output: <2.9 ms
Resistive Load on Current Output	0...500 Ω ‡
Inductive Load	0.1 mH
Calibration	None required
Non-linearity, Output	$\pm 0.05\%$ (in percent full scale)
Output Repeatability	$\pm 0.05\%$ (in percent full scale)‡
Module Error over Full Temperature Range	$\pm 0.55\%$
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Overvoltage Protection	Yes
Diagnostics Type	Over - or under-range/Clamps Exceeded by bit reporting Output wire broken or load resistance high by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V DC

*The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog output up to the maximum full scale range. The flag automatically resets when within the normal operating range unless configured to latch.

‡Includes wire resistance.

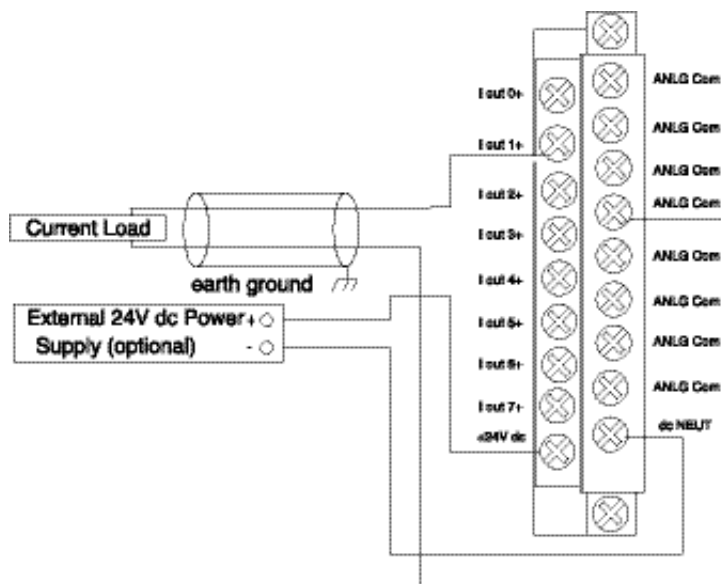
‡Repeatability is the ability of the output module to reproduce output readings when the same controller value is applied to it consecutively, under the same conditions and in the same direction.

1769-OF4VI Isolated Analog Voltage Output Module



Attribute	Value
Voltage Range, Analog Output	-10.5...+10.5V, -0.5...+0.5V -0.5...+10.5V, 0.5...+5.25V
Number of Outputs	4
Backplane Current (mA) at 5V	145 mA
Backplane Current (mA) at 24V	75 mA
Output Resolution, Bits	16 bits (unipolar), 15 bits + sign (bipolar) -10...+10V, 15.89 bits, 329 μ V/bit 0...+5V, 13.89 bits, 329 μ V/bit 0...+10V, 14.89 bits, 329 μ V/bit +1...+5V, 13.57 bits, 329 μ V/bit
Output Conversion Rate	10 ms
Step Response to 63% of FS, Voltage Output	<2.9 ms
Resistive Load on Current Output	2000 Ω , Min.
Inductive Load	0.1 mH max
Calibration	None required
Non-linearity, Output	$\pm 0.05\%$
Repeatability, Output	$\pm 0.05\%$
Module Error over Full Temperature Range	$\pm 0.80\%$
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Overvoltage Protection	Yes
Diagnostics Type	Over- or under-range/Clamps Exceeded by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V DC

1769-OF8C Analog Output Current Module



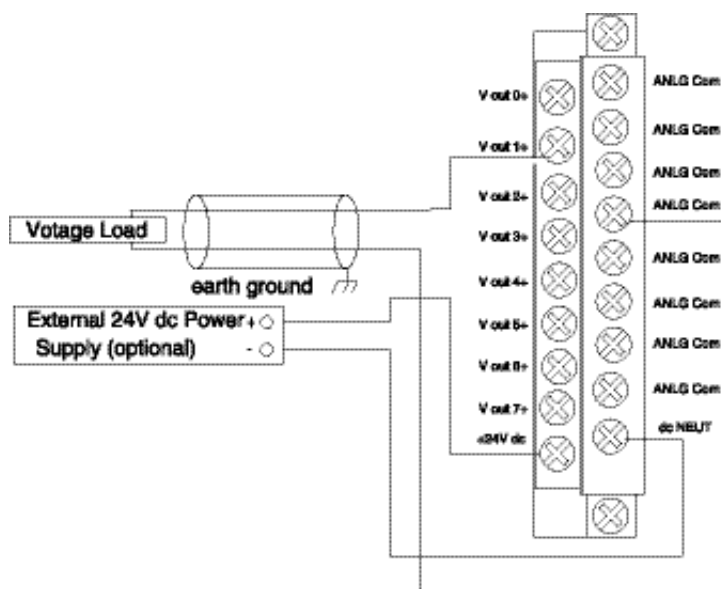
Attribute	Value
Current Range, Analog Output	0...20 mA or 4...20 mA 0...21 mA or 3.2...21 mA, full-scale
Number of Outputs	8
Backplane Current (mA) at 5V	145 mA
Backplane Current (mA) at 24V	160 mA*
Output Resolution, Bits	16 bits (unipolar) 4...20 mA: 15.59 bits, 0.323 μ A/bit 0...20 mA: 15.91 bits, 0.323 μ A/bit
Output Conversion Rate	5 ms
Step Response to 63% of FS, Current Output	<2.9 ms
Resistive Load on Current Output	0...500 Ω ‡
Inductive Load	0.1 mH max
Calibration	None required
Accuracy Drift w/Temp., Analog Outputs	Current Output: $\pm 0.0058\%$ Full Scale/ $^{\circ}$ C
Non-linearity, Output	$\pm 0.05\%$
Repeatability, Output	$\pm 0.05\%$ ‡
Module Error over Full Temperature Range	$\pm 0.55\%$ - Current
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Overvoltage Protection	Yes
Diagnostics Type	Over- or under-range by bit reporting Output wire broken or load resistance high by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V AC or 710V DC for 1 minute (qualification test), 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), output group to bus

*If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

‡Includes wire resistance.

‡Repeatability is the ability of the output module to reproduce output readings when the same controller value is applied to it consecutively, under the same conditions and in the same direction.

1769-OF8V Analog Output Voltage Module

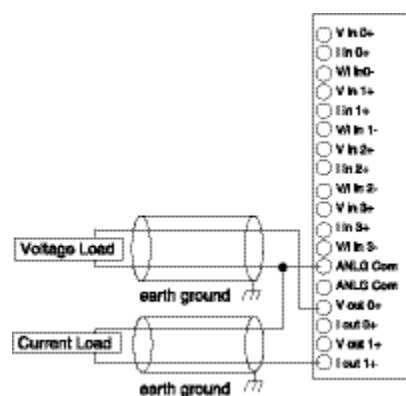


Attribute	Value
Voltage Range, Analog Output Full Scale	±10.5V DC -0.5...10.5V DC -0.5...5.25V DC 0.5...5.25V DC
Number of Outputs	8
Backplane Current (mA) at 5V	145 mA
Backplane Current (mA) at 24V	125 mA
Output Resolution, Bits	16 bits (unipolar) ±10V DC: 15.89 bits, 330 µV/bit 0...5V DC: 13.89 bits, 330 µV/bit 0...10V DC: 14.89 bits, 330 µV/bit 1...5V DC: 13.57 bits, 330 µV/bit
Output Conversion Rate	5 ms
Step Response to 63% of FS, Voltage Output	< 2.9 ms
Resistive Load on Current Output	0...500 Ω
Inductive Load	0.1 mH max
Calibration	None required
Accuracy Drift w/Temp., Analog Outputs	Voltage Output: ±0.0086% Full Scale/°C
Non-linearity, Output	±0.05%
Repeatability, Output	±0.05%
Module Error over Full Temperature Range	±0.8% - Voltage
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Overvoltage Protection	Yes
Diagnostics Type	Over- or under-range by bit reporting Output wire broken or load resistance high by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V AC or 710V DC for 1 minute (qualification test), 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), output group to bus

Wiring Differential Inputs



Wiring Analog Outputs



1769-IF4XOF2 Input Specifications

Attribute	Value
Voltage Category/Type, Input	0...10.5V DC
Current Range, Analog Input	0...21 mA, full-scale
Number of Inputs	4
Backplane Current (mA) at 5V	120 mA
Backplane Current (mA) at 24V	160 mA
Input Resolution, Bits	8 bits plus sign
Normal Mode Rejection Ratio	None
Input Impedance	Current Input: 150 Ω Voltage Input: 150 Ω
Accuracy Drift w/Temp., Analog Inputs	Current Input: $\pm 0.006\%$ ($\pm 0.01\%$ Full Scale)/ $^{\circ}\text{C}$ Voltage Input: $\pm 0.006\%$ ($\pm 0.01\%$ Full Scale)/ $^{\circ}\text{C}$
Non-linearity, Input	$\pm 0.4\%$ full scale
Repeatability, Input	$\pm 0.4\%$
Calibration	Not required
Diagnostics Type	Input: Overrange by bit reporting Output: Overrange by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V AC or 710V DC for 1 minute, 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), input to bus and output to bus.

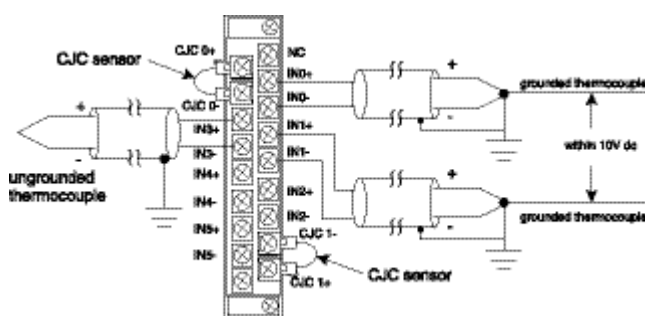
1769-IF4XOF2 Output Specifications

Attribute	Value
Voltage Category/Type, Output	0...10.5V DC
Current Range, Analog Output	0...21 mA, full-scale
Number of Outputs	2
Backplane Current (mA) at 5V	120 mA
Backplane Current (mA) at 24V	160 mA
Output Resolution, Bits	8 bits plus sign
Conversion Type, Outputs	Resistor String
Current Load on Voltage Output, Max.	10 mA
Resistive Load on Current Output	0...300 Ω
Load Range, Voltage Output	>1 k Ω @ 10V DC
Inductive Load	0.1 mH
Output Capacitance	1 μ F
Calibration	Not required
Accuracy Drift w/Temp., Analog Inputs	Current Input: $\pm 0.006\%$ ($\pm 0.01\%$ Full Scale)/ $^{\circ}$ C Voltage Input: $\pm 0.006\%$ ($\pm 0.01\%$ Full Scale)/ $^{\circ}$ C
Non-linearity, Output	$\pm 0.4\%$ full scale
Repeatability, Output	$\pm 0.05\%$
Open Circuit Protection	Yes
Short Circuit Protection (Yes/No)	Yes
Diagnostics Type	Input: Overrange by bit reporting Output: Overrange by bit reporting
Power Supply Distance Rating	8 modules
Isolation Voltage	500V AC or 710V DC for 1 minute, 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation), input to bus and output to bus.

1769-IT6 Thermocouple Input Module

The module contains a removable terminal block. Channels are wired as differential inputs. Two cold-junction compensation (CJC) sensors are attached to the terminal block to enable accurate readings from each channel. These sensors compensate for offset voltages introduced into the input signal as a result of the cold junction where the thermocouple wires are connected to the module.

Important: For proper operation, the CJC sensors must be installed on the thermocouple module.



Attribute	Value
Number of Inputs	6, plus 2 cold junction sensors
Backplane Current (mA) at 5V	100 mA
Backplane Current (mA) at 24V	40 mA
Conversion Type, Inputs	Delta-Sigma
Input Filtering	Programmable notch filter with multiple frequencies.
Normal Mode Rejection Ratio	85 dB (minimum) at 50 Hz (with 10 Hz or 50 Hz filter) 85 dB (minimum) at 60 Hz (with 10 Hz or 60 Hz filter)
Common Mode Rejection Ratio	115 dB (minimum) at 50 Hz (with 10 Hz or 50 Hz filter) 115 dB (minimum) at 60 Hz (with 10 Hz or 60 Hz filter)
Common Mode Voltage	±10V DC per channel
Non-linearity, Input	±0.03% full scale
Repeatability, Input	±0.03%
Open Circuit Detection Time	7 ms...2.1 s
Calibration	The module performs autocalibration upon power-up and whenever a channel is enabled. You can also program the module to calibrate every five minutes using the Enable/Disable Cyclic Calibration bit.
Diagnostics Type	Over- or underrange and open circuit by bit reporting.
Power Supply Distance Rating	8 modules

Data Formats

Choose from these data formats:

- Engineering units x 1 (in 0.1 °C, 0.1 °F or 0.01 mV)
- Engineering units x 10 (in °C, °F, or 0.1 mV)
- Scaled-for-PID (0...16,383)
- Percent of full-scale (0...10,000)
- Raw/proportional data (-32,767...32,767)

Input Type	Engineering Units x 1		Engineering Units x 10	
	0.1 °C	0.1 °F	1.0 °C	1.0 °F
J	-2100...12,000	-3460...21,920	-210...1200	-346...2192
K	-2700...13,700	-4540...24,980	-270...1370	-454...2498
T	-2700...4000	-4540...7520	-270...400	-454...752
E	-2700...10,000	-4540...18,320	-270...1000	-454...1832
R	0...17,680	320...32,140	0...1768	32...3214
S	0...17,680	320...32,140	0...1768	32...3214
B	3000...18,200	5720...32,767*	300...1820	572...3308
N	-2100...13,000	-3460...23,720	-210...1300	-346...2372
C	0...23,150	320...32,767*	0...2315	32...4199
±50 mV	-5000...5000*		-500...500*	
±100 mV	-10,000...10,000*		-1000...1000*	

*Type B and C thermocouples cannot be represented in engineering units x 1 (°F) above 3276.7 °F; therefore, it will be treated as an over-range error.

*When millivolts are selected, the temperature setting is ignored. Analog input data is the same for °C or °F selection.

Repeatability

Input Type	Repeatability for 10 Hz Filter*
J	±0.1 °C (±0.18 °F)
N (-110...1300 °C [-166...2372 °F])	±0.1 °C (±0.18 °F)
N (-210...-110 °C [-346...-166 °F])	±0.25 °C (±0.45 °F)
T (-170...400 °C [-274...752 °F])	±0.1 °C (±0.18 °F)
T (-270...-170 °C [-454...-274 °F])	±1.5 °C (±2.7 °F)
K (-270...1370 °C [-454...2498 °F])	±0.1 °C (±0.18 °F)
K (-270...-170 °C [-454...-274 °F])	±2.0 °C (±3.6 °F)
E (-220...1000 °C [-364...1832 °F])	±0.1 °C (±0.18 °F)
E (-270...-220 °C [-454...-364 °F])	±1.0 °C (±1.8 °F)
S and R	±0.4 °C (±0.72 °F)
C	±0.7 °C (±1.26 °F)
B	±0.2 °C (±0.36 °F)
±50 mV	±6 µV
±100 mV	±6 µV

*Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

Repeatability at any other temperature in the 0...60 °C (32...140 °F) range is the same as long as the temperature is stable.

Inputs and Ranges

Input Type	Range
J	-210...1200 °C (-346...2192 °F)
K	-270...1370 °C (-454...2498 °F)
T	-270...400 °C (-454...752 °F)
E	-270...1000 °C (-454...1832 °F)
R	0...1768 °C (32...3214 °F)
S	0...1768 °C (32...3214 °F)
B	300...1820 °C (572...3308 °F)
N	-210...1300 °C (-346...2372 °F)
C	0...2315 °C (32...4199 °F)
±50 mV	-50...50 mV
±100 mV	-100...100 mV

Accuracy

Input Type	Autocalibration Enabled Accuracy for 10, 50, and 50 Hz Filters, Max.		Autocalibration Disabled Temperature Drift, Max.
	25 °C (77 °F)	0...60 °C (32...140 °F)	0...60 °C (32...140 °F)
J (-210...1200 °C [-346...2192 °F])	±0.6 °C (± 1.1 °F)	±0.9 °C (± 1.7 °F)	±0.0218 °C/°C (±0.0218 °F/°F)
N (-200...1300 °C [-328...2372 °F])	±1.0 °C (± 1.8 °F)	±1.5 °C (±2.7 °F)	±0.0367 °C/°C (±0.0367 °F/°F)
N (-210...-200 °C [-346...-328 °F])	±1.2 °C (±2.2 °F)	±1.8 °C (±3.3 °F)	±0.0424 °C/°C (±0.0424 °F/°F)
T (-230...400 °C [-382...752 °F])	±1.0 °C (± 1.8 °F)	±1.5 °C (±2.7 °F)	±0.0349 °C/°C (±0.0349 °F/°F)
T (-270...-230 °C [-454...-382 °F])	±5.4 °C (± 9.8 °F)	±7.0 °C (±12.6 °F)	±0.3500 °C/°C (±0.3500 °F/°F)
K (-230...1370 °C [-382...2498 °F])	±1.0 °C (± 1.8 °F)	±1.5 °C (±2.7 °F)	±0.4995 °C/°C [±0.4995 °F/°F]
K (-270...-225 °C [-454...-373 °F])	±7.5 °C (± 13.5 °F)	±10.0 °C (± 18.0 °F)	±0.0378 °C/°C (±0.0378 °F/°F)
E (-210...1000 °C [-346...1832 °F])	±0.5 °C (± 0.9 °F)	±0.8 °C (±1.5 °F)	±0.0199 °C/°C (±0.0199 °F/°F)
E (-270...-210 °C [-454...-346 °F])	±4.2 °C (± 7.6 °F)	±6.3 °C (±11.4 °F)	±0.2698 °C/°C (±0.2698 °F/°F)
R	±1.7 °C (± 3.1 °F)	±2.6 °C (± 4.7 °F)	±0.0613 °C/°C (±0.0613 °F/°F)
S	±1.7 °C (± 3.1 °F)	±2.6 °C (± 4.7 °F)	±0.0600 °C/°C (±0.0600 °F/°F)
C	±1.8 °C (±3.3 °F)	±3.5 °C (±6.3 °F)	±0.0899 °C/°C (±0.0899 °F/°F)
B	±3.0 °C (±5.4 °F)	±4.5 °C (±8.1 °F)	±0.1009 °C/°C (±0.1009 °F/°F)
±50 mV	±15 µV	±25 µV	±0.44 µV/°C (±0.80 µV/°F)
±100 mV	±20 µV	±30 µV	±0.69 µV/°C (±1.25 µV/°F)

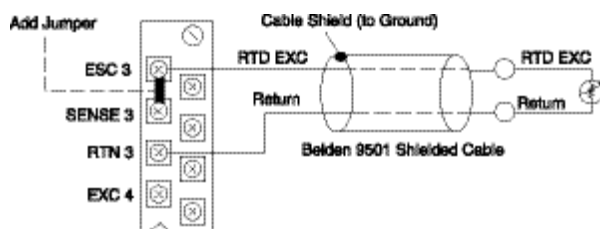
1769-IR6 RTD Input Module

Each channel is individually configurable via software for two- or three-wire RTD or direct-resistance input devices. Channels are compatible with four-wire sensors, but the fourth sense wire is not used. Two programmable-excitation current values (0.5 mA and 1.0 mA) are provided, to limit RTD self-heating.

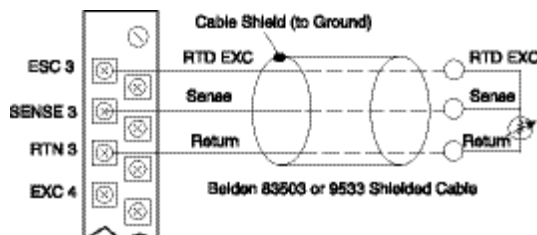
Important: The module accepts input from RTDs with up to three wires. If your application requires a four-wire RTD, one of the two lead compensation wires is not used, and the RTD is treated like a three-wire sensor. The third wire provides lead wire compensation.

When configured for RTD inputs, the module can convert the RTD readings into linearized digital-temperature readings in °C or °F. When configured for resistance analog inputs, the module can convert voltages into linearized resistance values in ohms. The module assumes that the direct resistance input signal is linear prior to input to the module.

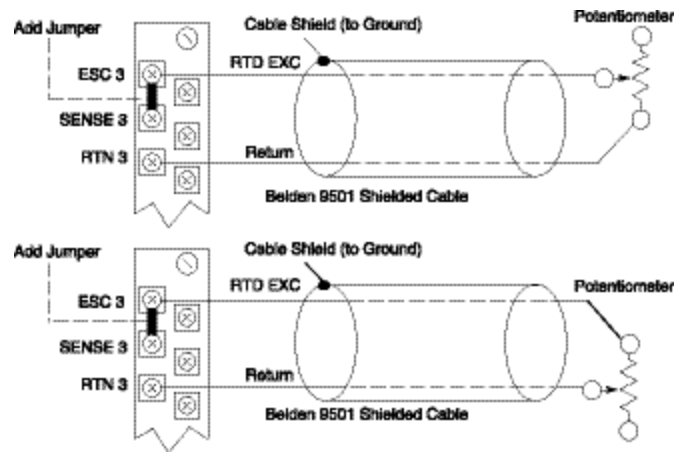
Two-wire RTD Configuration



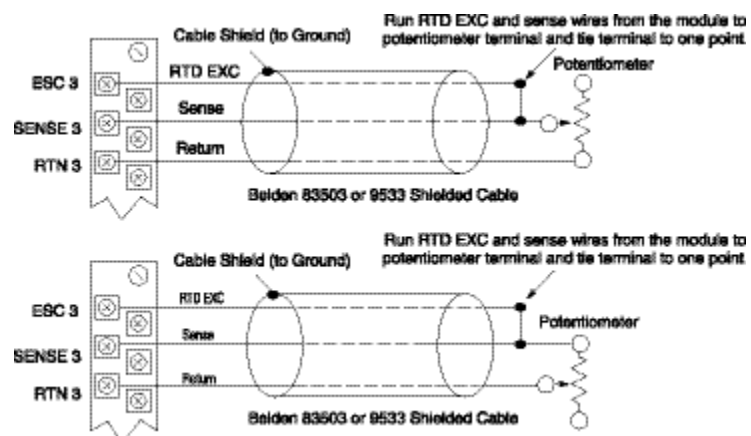
Three-wire RTD Configuration



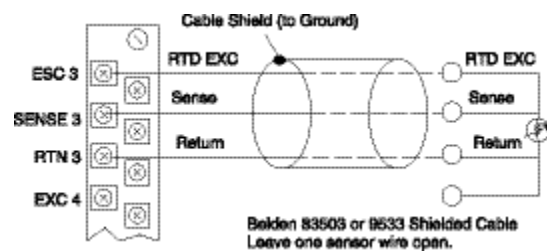
Two-wire Potentiometer Configuration



Three-wire Potentiometer Configuration



Four-wire RTD Configuration

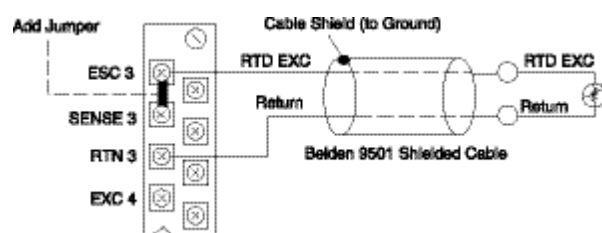


Each channel is individually configurable via software for two- or three-wire RTD or direct-resistance input devices. Channels are compatible with four-wire sensors, but the fourth sense wire is not used. Two programmable-excitation current values (0.5 mA and 1.0 mA) are provided, to limit RTD self-heating.

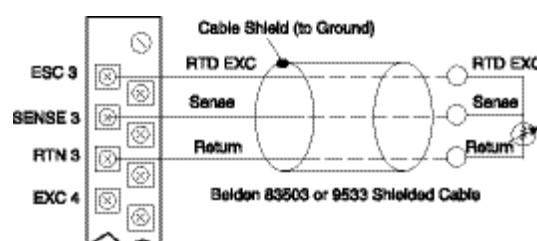
Important: The module accepts input from RTDs with up to three wires. If your application requires a four-wire RTD, one of the two lead compensation wires is not used, and the RTD is treated like a three-wire sensor. The third wire provides lead wire compensation.

When configured for RTD inputs, the module can convert the RTD readings into linearized digital-temperature readings in °C or °F. When configured for resistance analog inputs, the module can convert voltages into linearized resistance values in ohms. The module assumes that the direct resistance input signal is linear prior to input to the module.

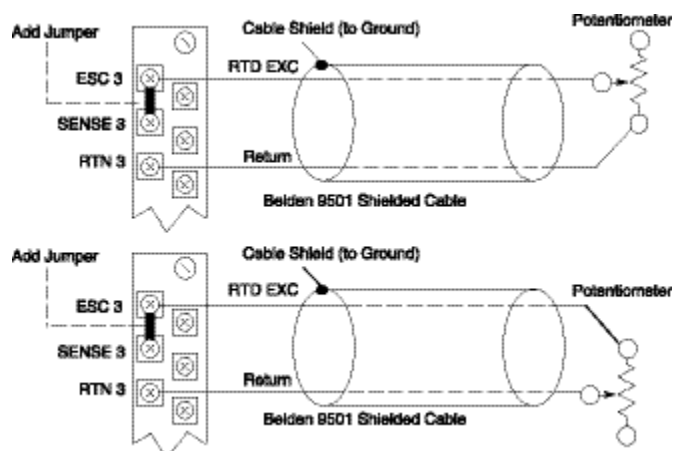
Two-wire RTD Configuration



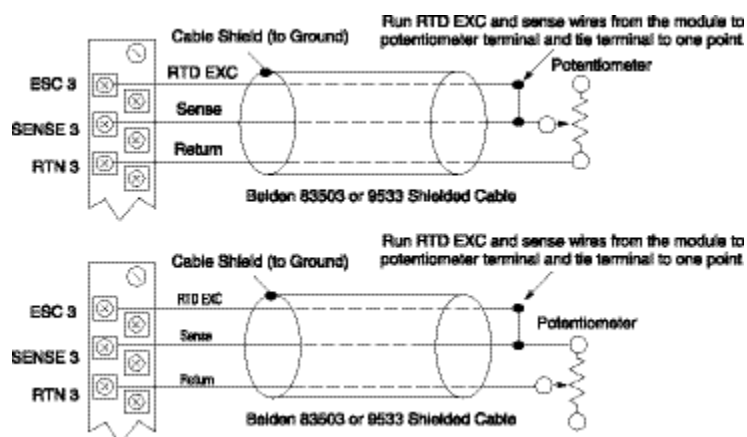
Three-wire RTD Configuration



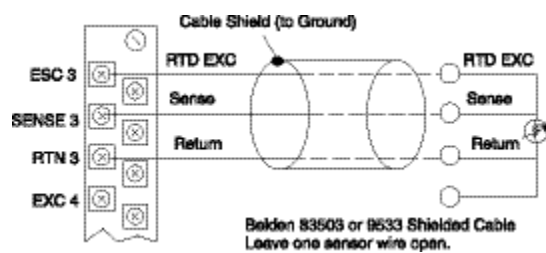
Two-wire Potentiometer Configuration



Three-wire Potentiometer Configuration



Four-wire RTD Configuration



1769-IR6 Specifications

Attribute	Value
Number of Inputs	6
Backplane Current (mA) at 5V	100 mA
Backplane Current (mA) at 24V	45 mA
Conversion Type, Inputs	Sigma-Delta
Input Filtering	Low pass digital filter with programmable notch filter.
Input Resolution, Bits	Input filter and configuration dependent
Normal Mode Rejection Ratio	70 dB minimum at 50 Hz with the 10 or 50 Hz filter selected 70 dB minimum at 60 Hz with the 10 or 60 Hz filter selected
Common Mode Rejection Ratio	110 dB minimum at 50 Hz with the 10 or 50 Hz filter selected 110 dB minimum at 60 Hz with the 10 or 60 Hz filter selected
Common Mode Voltage	±10V DC per channel
Non-linearity, Input	±0.5% full scale
Repeatability, Input	±0.01 °C (0.018 °F) for Ni and NiFe ±0.2 °C (0.36 °F) for other RTD inputs ±0.04 W for 150 W resistances ±0.2 W for other resistances
Open Circuit Detection Time	6 ms...303 s
Calibration	The module performs autocalibration on channel enable and on a configuration change between channels. You can also program the module to calibrate every five minutes.
Diagnostics Type	Over- or under-range or broken input by bit reporting.
Power Supply Distance Rating	8 modules

Data Formats

Choose from these data formats:

- Engineering units x 1 (in 0.1 °C, 0.1 °F or 0.1 Ω)
- Engineering units x 10 (in 1.0 °C, 1.0 °F, or 1.0 Ω)
- Scaled-for-PID (0...16,383)
- Percent of full-scale (0...10,000)
- Raw/proportional data (-32,767...32,767)

Input Type	Engineering Units x 1		Engineering Units x 10	
	0.1 °C	0.1 °F	1.0 °C	1.0 °F
100 Ω Platinum 385	-2000...8500	-3280...15,620	-200...850	-328...1562
200 Ω Platinum 385				
500 Ω Platinum 385				
1000 Ω Platinum 385				
100 Ω Platinum 3916	-2000...6300	-3280...11,660	-200...630	-328...1166
200 Ω Platinum 3916				
500 Ω Platinum 3916				
1000 Ω Platinum 3916				
10 Ω Copper 426	-1000...2600	-1480...5000	100...260	-148...500
120 Ω Nickel 618	-1000...2600	-1480...5000	100...260	-148...500
120 Ω Nickel 672	-800...2600	-1120...5000	-80...260	-112...500
604 Ω Nickel Iron 518	-1000...2000	-3280...1560	-100...200	-328...156

Accuracy

Input Type	Autocalibration Enabled Scaled Accuracy, Max.		Autocalibration Disabled Temperature Drift, Max.
	25 °C (77 °F)	0...60 °C (32...140 °F)	0...60 °C (32...140 °F)
100 Ω Platinum 385	±0.5 °C (±0.9 °F)	±0.9 °C (±1.62 °F)	±0.026 °C/°C (±0.026 °F/°F)
200 Ω Platinum 385			
500 Ω Platinum 385			
1000 Ω Platinum 385			
100 Ω Platinum 3916	±0.4 °C (±0.72 °F)	±0.8 °C (±1.44 °F)	±0.023 °C/°C (±0.023 °F/°F)
200 Ω Platinum 3916			
500 Ω Platinum 3916			
1000 Ω Platinum 3916			
10 Ω Copper 426	±0.6 °C (1.08 °F)	±1.1 °C (1.98 °F)	±0.032 °C/°C (0.032 °F/°F)
120 Ω Nickel 618	±0.2 °C (±0.36 °F)	±0.4 °C (±0.72 °F)	±0.012 °C/°C (±0.012 °F/°F)
120 Ω Nickel 672	±0.2 °C (±0.36 °F)	±0.4 °C (±0.72 °F)	±0.012 °C/°C (±0.012 °F/°F)
604 Ω Nickel Iron 518	±0.3 °C (±0.54 °F)	±0.5 °C (±0.9 °F)	±0.015 °C/°C (±0.015 °F/°F)

When you use Platinum 385 RTDs with 0.5 mA excitation current, the module's accuracy is:

- ±0.5 °C (0.9 °F) after you apply power to the module or perform an autocalibration at 25 °C (77 °F) ambient, with module operating temperature at 25 °C (77 °F).
- $\pm[0.5 \text{ °C (0.9 °F)} + DT \pm 0.026 \text{ deg./°C (}\pm 0.026 \text{ deg./°F)}]$ after you apply power to the module or perform an autocalibration at 25 °C (77 °F) ambient, with module operating temperature 0...60 °C (32...140 °F). DT is the temperature difference between the actual-module operating temperature and 25 °C (77 °F). The value 0.026 deg./°C (±0.026 deg./°F) is the temperature drift shown in the table above.
- ±0.9 °C after you apply power to the module or perform an autocalibration at 60 °C (140 °F) ambient, with module operating temperature at 60 °C (140 °F).

Cable Specifications

Description	Belden 9501	Belden 9533	Belden 83503
Use	<ul style="list-style-type: none"> Two-wire RTDs and potentiometers 	<ul style="list-style-type: none"> Three-wire RTDs and potentiometers Short runs less than 30 m (100 ft) and normal humidity levels 	<ul style="list-style-type: none"> Three-wire RTDs and potentiometers Long runs greater than 30 m (100 ft) or high humidity levels
Conductors	Two 0.21 mm ² (24 AWG) tinned copper (7 x 32)	Three 0.21 mm ² (24 AWG) tinned copper (7 x 32)	Three 0.21 mm ² (24 AWG) tinned copper (7 x 32)
Shield	Beldfoil aluminum polyester shield with copper drain wire	Beldfoil aluminum polyester shield with copper drain wire	Beldfoil aluminum polyester shield with tinned braid shield
Insulation	PVC	S-R PVC	Teflon
Jacket	Chrome PVC	Chrome PVC	Red Teflon
Agency Approvals	NEC Type CM	NEC Type CM	NEC Art-800 Type CMP
Temperature Rating	80 °C (176 °F)	80 °C (176 °F)	200 °C (392 °F)

RTD Standards

Input Type	$\alpha \pm$	IEC-751 1983, Amend. 2 1995	DIN 43760 1987	SAMA2 Standard RC21-4-1966§	Japanese Industrial Standard JIS C1604-1989	Japanese Industrial Standard JIS C1604-1997	Minco♣
100 Ω Platinum 385	0.00385	X	X			X	
200 Ω Platinum 385		X	X			X	
500 Ω Platinum 385		X	X			X	
1000 Ω Platinum 385		X	X			X	
100 Ω Platinum 3916	0.03916				X		
200 Ω Platinum 3916					X		
500 Ω Platinum 3916					X		
1000 Ω Platinum 3916					X		
10 Ω Copper 426★	0.00426			X			
120 Ω Nickel 618‡	0.00618		X				
120 Ω Nickel 672	0.00372						X
604 Ω Nickel Iron 518	0.00518						X

★Actual value at 0 °C (32 °F) is 9.042 Ω per SAMA standard RC21-4-1966.

‡Actual value at 0 °C (32 °F) is 100 Ω per SAMA standard RC21-4-1966.

‡This is the temperature coefficient of resistance which is defined as the resistance change per Ω per °C.

§Scientific Apparatus Makers Association.

♣Minco type NA (Nickel) and Minco type FA (Nickel-Iron).

Resistance Device Compatibility

Resistance Device Type	Resistance Range (0.5 mA excitation)	Resistance Range (1.0 mA excitation)
150 Ω	0...150 Ω	0...150 Ω
500 Ω	0...500 Ω	0...500 Ω
1000 Ω	0...1000 Ω	0...1000 Ω
3000 Ω	0...3000 Ω	Not allowed

RTD and Resistance Input Ranges

Input Type*	Temperature Range (0.5 mA excitation)	Temperature Range (1.0 mA excitation)
100 Ω Platinum 385	-200...850 °C (-328...1562 °F)	-200...850 °C (-328...1562 °F)
200 Ω Platinum 385	-200...850 °C (-328...1562 °F)	-200...850 °C (-328...1562 °F)
500 Ω Platinum 385	-200...850 °C (-328...1562 °F)	-200...850 °C (-328...1562 °F)
1000 Ω Platinum 385	-200...850 °C (-328...1562 °F)	Not allowed
100 Ω Platinum 3916	-200...630 °C (-328...1166 °F)	-200...630 °C (-328...1166 °F)
200 Ω Platinum 3916	-200...630 °C (-328...1166 °F)	-200...630 °C (-328...1166 °F)
500 Ω Platinum 3916	-200...630 °C (-328...1166 °F)	-200...630 °C (-328...1166 °F)
1000 Ω Platinum 3916	-200...630 °C (-328...1166 °F)	Not allowed
10 Ω Copper 426	Not allowed	-100...260 °C (-148...500 °F)
120 Ω Nickel 618*	-100...260 °C (-148...500 °F)	-100...260 °C (-148...500 °F)
120 Ω Nickel 672	-80...260 °C (-112...500 °F)	-80...260 °C (-112...500 °F)
604 Ω Nickel Iron 518	-200...180 °C (-328...338 °F)	-100...200 °C (-148...392 °F)

*Digits following the RTD type represent the temperature coefficient of resistance (α), which is defined as the resistance change per Ω per °C. For instance, platinum 385 refers to platinum RTD with $\alpha = 0.00385 \Omega/\Omega\cdot^{\circ}\text{C}$, or simply $0.00385/^{\circ}\text{C}$.

*Actual value at 0 °C (32 °F) is 100 Ω per DIN standard.

1769-HSC High-speed Counter Module

Use the 1769-HSC when you need these features:

- Intelligent counter module with its own microprocessor and I/O that is capable of reacting to high-speed input signals.
- Count and rate values can be used to activate up to four embedded outputs and 12 virtual outputs based on user-defined ranges.
- Signals received at the inputs are filtered, decoded, and counted.
- Signals are also processed to generate rate and time-between-pulses (pulse interval) data.
- Counter module capable of interfacing with up to two channels of quadrature or four channels of pulse/count inputs.

Attribute	Value
Backplane Current (mA) at 5V	425 mA
Power Supply Distance Rating	4 modules

Input Specifications

Attribute	Value
Voltage Category/Type, Input	2
Current Range, Analog Input	-30...+30V DC
Voltage, On-State Input, Max.	30V DC
Current, On-State Input, Max.	15 mA
Voltage, Off-State Input, Max.	1.0V DC
Current, Off-State Input, Max.	1.5 mA
Leakage Current, Off-State Input, Max	1.5 mA
Input Impedance, Nom.	1950 Ω
Input Pulse Width, Min.	250 ns
Input Phase Separation, Min.	131 ns
Isolation Voltage	1200V AC or 1659V DC for 1s, 75V DC working voltage (IEC Class 2 reinforced insulation), input to bus, input to input, and output to bus.

Output Specifications

Attribute	Value
Voltage Category/Type, Output	5...30V DC
Current Range, Analog Output	User Power - 0.1V DC
Current, On-State Output, Max.	1 A per point 4 A per module
Voltage Drop, On-State Output, Max.	0.5V DC
Leakage Current, Off-State Output, Max	5 μ A
Reverse Polarity Protection	30V DC
Isolation Voltage	1200V AC or 1659V DC for 1s, 75V DC working voltage (IEC Class 2 reinforced insulation), input to bus, input to input, and output to bus.

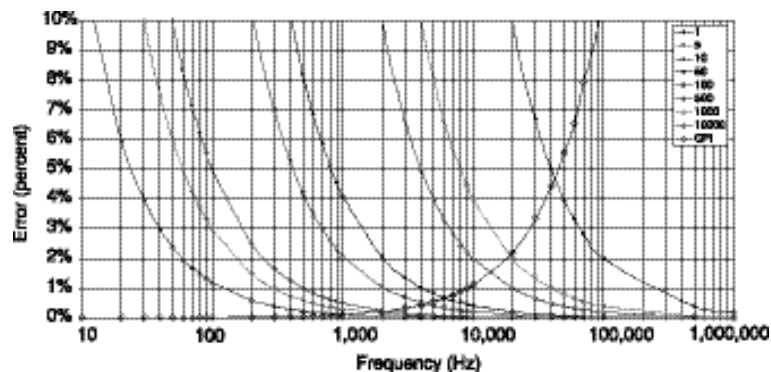
Throughput and Timing

Operation	Description	Timing, Max.
Input file update time	The delay between the time the module receives a pulse and when the Compactbus count value is updated.	1 ms
Output turn-on time	The time it takes for the real output to reach 90% output voltage after commanded by the module, not including processor scan time.	400 μ s
Output turn-off time	The time it takes for the real output to reach 10% output voltage after commanded by the module, not including the processor scan time.	200 μ s

Rate Accuracy

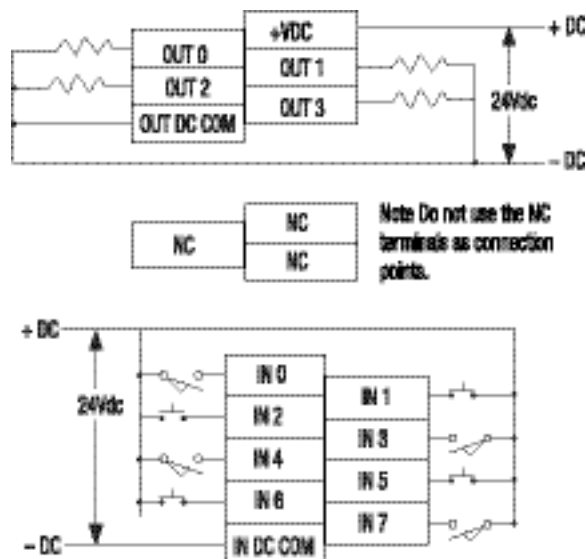
This graph shows rate error at various frequencies.

- Of the lines that rise at low frequencies, the leftmost is a 10 second update time (CtrnCyclicRateUpdateTime = 10,000).
- The rightmost line is a 1 ms update time (CtrnCyclicRateUpdateTime = 1).
- The line that rises at high frequencies illustrates Ctr[n].PulseInterval.



1769 Compact Combination Module

1769-BOOLEAN Combination 24V DC Sink Input/Source Output BOOLEAN Control Module



General Specifications

Attribute	Value
Closed Loop Time (digital filter = 0)	Output on-state current ≥ 5 mA: 100 μ s max Output on-state current < 5 mA: 150 μ s max
Backplane Current (mA) at 5V	220 mA
Heat Dissipation	3.55 Total W (The W per point, plus the minimum W, with all points energized.)
Power Supply Distance Rating	8 modules*
Isolated Groups	Group 1: inputs 0 to 7 Group 2: outputs 0 to 3
Input Point to Output Point Isolation	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation)
Vendor I.D. Code	1
Product Type Code	109
Product Code	37

*The module may not be more than 8 modules away from the power supply or controller.

Input Specifications

Attribute	Value
Voltage Category/Type, Input	24V DC sinking*
Voltage Range, On-State Input	stbUCString::convert: Character with charcode: "8451" met
Number of Inputs	8 real 8 virtual
Digital Filter Time Constant	OFF to ON: 0 s, 100 μ s, 200 μ s, 500 μ s, 1 ms, 2 ms, 4 ms, 8 ms ON to OFF: 0 s, 100 μ s, 200 μ s, 500 μ s, 1 ms, 2 ms, 4 ms, 8 ms
Hardware Delay, Max	OFF to ON: 10 μ s ON to OFF: 10 μ s
Voltage, Off-State Input, Max.	5V DC
Current, Off-State Input, Max.	1.5 mA
Voltage, On-State Input, Min.	10V DC
Current, On-State Input, Min.	2.0 mA
Inrush Current, Max.	250 mA
Impedance	2.0 k Ω @ 24V DC, nom 2.3 k Ω @ 30V DC, nom
IEC Input Compatibility	Type 3
Input Point to Bus (CompactBus) Isolation	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation)

*Sinking Input - Sink describes the current flow between the I/O module and the field device. Sinking I/O circuits are driven by a current sourcing field device. Field devices connected to the positive side (+V) of the field supply are sourcing field devices. **Europe:** DC sinking input and sourcing output module circuits are the commonly used options.

Output Specifications

Attribute	Value
Voltage Category/Type, Input	24V DC sourcing*
Voltage Range, On-State Output	20.4...26.4V DC
Number of Outputs	4
Signal On Delay, Max (resistive load)	10 μ s, output on-state current \geq 5 mA
Signal Off Delay, Max (resistive load)	10 μ s, output on-state current \geq 5 mA
Leakage Current, Off-State Output, Max	1.0 mA @ 26.4V DC‡
Current, On-State Output, Min.	1.0 mA
Voltage Drop, On-State Output, Max.	1.0V DC @ 1.0 A
Continuous Current per Point, Max	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F) Refer to the temperature derating curve.
Surge Current per Output, Max.	2.0 A (Repeatability is once every 2 s for a duration of 10 ms.)‡
Output Point to Bus (CompactBus) Isolation	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation)

*Sourcing Output - Source describes the current flow between the I/O module and the field device. Sourcing output circuits supply current to sinking field devices. Field devices connected to the negative side (DC common) of the field power supply are sinking field devices. **Europe:** DC sinking input and sourcing output module circuits are the commonly used options.

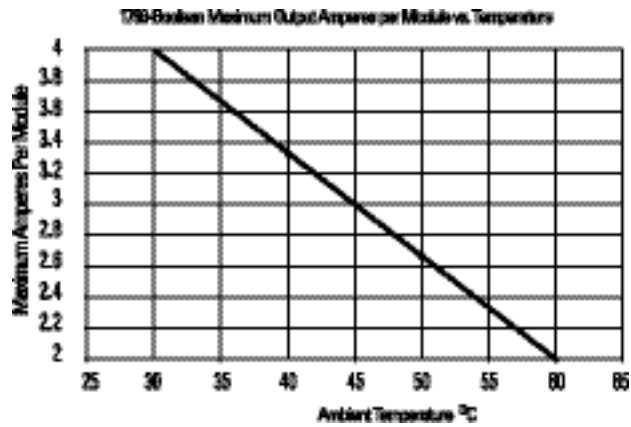
‡Typical Loading Resistor - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k Ω , 1/2 W resistor for transistor outputs, 24V DC operation.

‡Recommended Surge Suppression - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

Temperature Derating

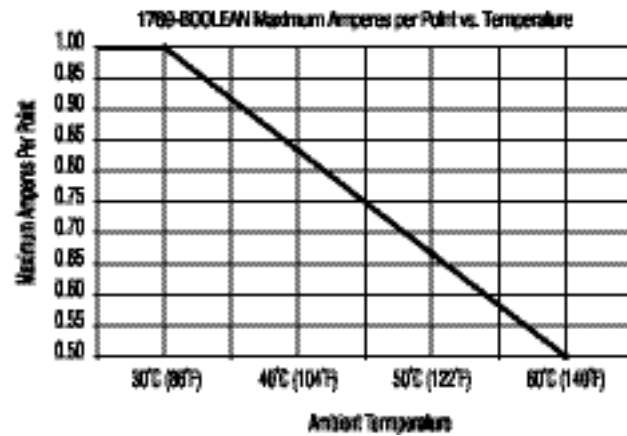
The area within the curve represents the safe operating range for the module under various conditions of user-supplied voltages and ambient temperatures.

1769-BOOLEAN Module Maximum Output Amperes per Module versus Temperature



1769-BOOLEAN Module Maximum Output Amperes per Point versus Temperature

Temperature Derating



1769-ARM Address Reserve Module

Use a 1769-ARM address reserve module in CompactLogix systems to cost-effectively reserve module slots. After creating an I/O configuration and user program, you can remove and replace any I/O module in the system with a 1769-ARM module once you inhibit the removed module in RSLogix 5000 programming software.

Cat. No.	Number of Inputs	Number of Outputs	Backplane Current @ 5V	Power Supply Distance Rating
1769-ARM	—	—	60 mA	8 modules

Communication Modules

For network connectivity, you can select from these communication modules.

To Connect	Cat. No.
CompactLogix controller to a DeviceNet network	1769-SDN
Distributed 1769 I/O modules to a DeviceNet network	1769-ADN/B*
ASCII devices over RS-232, RS-485, and RS-422 networks	1769-ASCII
Compact I/O modules to up to three DPI/SCANport-enabled drives or power products‡	1769-SM1
Compact I/O modules to PowerFlex 4-class drives.‡	1769-SM2

Certifications: C-UL-US for Class I, Division 2, Group A,B,C,D Hazardous Locations, CE, C-Tick, ODVA

*The series A 1769-ADN adapter does not support the 1769-OA16, 1769-OW16, 1769-IF4XOF2, or 1769-HSC I/O modules.

‡The 1769-SM1 Compact I/O to DPI/SCANport module can be used with MicroLogix 1500, CompactLogix, or a remote 1769-based adapter, such as the 1769-ADN module.

‡The 1769-SM2 Compact I/O to DSI module can be used with a MicroLogix 1500, CompactLogix, or remote 1769-based adapter, such as the 1769-ADN module.

1769-SDN DeviceNet Scanner Module

Attribute	Value
Backplane Current (mA) at 5V	440 mA
DeviceNet Power Requirements, Max.	90 mA @ 11V DC 110 mA @ 25V DC (N.E.C. Class 2)
Communication Rate	125k Kbps 250k Kbps 500k Kbps
Cable Type	Allen-Bradley part no. 1485C-P1-Cxxx.*
DeviceNet Communication Rate, Max.	125 Kbps (500 meters max) 500 Kbps (100 meters max)
Power Supply Distance Rating	4 modules
Isolation Voltage	500V AC for 1 minute or 707V DC for 1 minute, 30V DC working voltage (IEC Class 2 reinforced insulation), DeviceNet to bus
Vendor I.D. Code	1
Product Type Code	12
Product Code	105

*Refer to publication DN-2.5 for more information.

1769-ADN DeviceNet Adapter Module

Attribute	Value
Backplane Current (mA) at 5V	450 mA
DeviceNet Power Requirements, Max.	90 mA @ 24V DC (+4%) (N.E.C. Class 2)
Communication Rate	125 Kbps 250 Kbps 500 Kbps
Cable Type	Allen-Bradley part no. 1485C-P1-Cxxx.*
I/O Module Capacity	30
Power Supply Distance Rating	5 modules
Isolation Voltage	Tested at 710V DC for 60 s
Vendor I.D. Code	1
Product Type Code	12
Product Code	69

*Refer to publication DN-2.5 for more information.

1769-ASCII Module

Attribute	Value
Backplane Current (mA) at 5V	425 mA
Input Words	108
Output Words	108
Configuration Words	31
Number of Inputs	2 full-duplex (RS-232, RS-422) 2 half-duplex (RS-485)
Serial Input Voltage Signal	3...25V DC with respect to signal ground (SG) "0", Asserted, ON, Space, Active -3...-25V DC with respect to signal ground (SG) "1", Disasserted, OFF, Mark, Inactive
Cable Type	Belden 8761 (shielded)
Power Supply Distance Rating	4 modules
Isolation Voltage	50V continuous Tested at 500V AC for 60 s, channel to channel, channels to system
Vendor I.D. Code	1
Product Type Code	109
Product Code	66

1769-SM1 Module

Attribute	Value
Backplane Current (mA) at 5V	280 mA*
Backplane Current (mA) at 24V	60 mA‡
Communication Interface Type	SCANport Interface
Communication Rate	DPI or SCANport 125 Kbps or 500 Kbps
Enclosure Type Rating	IP20
Communication Channels	3 (any combination of DPI or SCANport)
Connecting Cable Length	SCANport Host (1336, 1305, etc.): 10 meters max DPI Host (PowerFlex, etc.): 10 meters max
Cable Type	1202-Cxx
Power Supply Distance Rating	6 modules‡

*Supplied by the controller.

‡Per channel, supplied by the DPI/SCANport host.

‡The module may not be more than 6 modules away from the power supply.

1769-SM2 Module

Attribute	Value
Backplane Current (mA) at 5V	350 mA*
Backplane Current (mA) at 24V	0 mA
Communication Interface Type	Modbus RTU interface
Communication Rate	300...38.4 Kbps
Enclosure Type Rating	IP20
Communication Channels	3
Connecting Cable Length	10 m max with 8 conductor cable (22-RJ45CBL-C20), 400 ft max with 2 conductor cable (AK-U0-RJ45-TB2P adapter)
Cable Type	22-RJ45CBL-C20 or AK-U0-RJ45-TB2P adapter
Power Supply Distance Rating	4 modules‡

*Supplied by the controller.

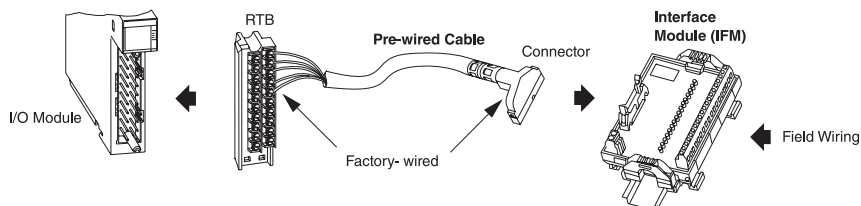
‡The module may not be more than 4 modules away from the power supply.

Wiring Systems



As an alternative to buying RTBs and connecting the wires yourself, you can buy a wiring system of:

- interface modules (IFMs) that provide the output terminal blocks for digital I/O modules. Use the pre-wired cables that match the I/O module to the IFM.
- analog interface modules (AIFMs) that provide the output terminal blocks for analog I/O modules. Use the pre-wired cables that match the I/O module to the AIFM.
- I/O module-ready cables. One end of the cable assembly is an RTB that plugs into the front of the I/O module. The other end has individually color-coded conductors that connect to a standard terminal block.



PanelConnect Modules

A PanelConnect module and its sensor connection system connect sensors directly to I/O modules using convenient pre-built cables and connectors.

The PanelConnect module mounts on the enclosure and creates the correct seal for the entry of the sensor connections. You do not need to seal the opening where the sensor cables enter the enclosure, create custom connectors, or wire to those custom connectors.

Power Supplies

Compact I/O power supplies distribute power from either side of the power supply. For example, a 2 A at 5V DC power supply (1769-PA2, 1769-PB2) can provide 1 A to the right side of the power supply and 1 A to the left. A 4 A at 5V DC power supply (1769-PA4, 1769-PB4) can provide 2 A to the right side of the power supply and 2 A to the left.

Attribute	1769-PA2	1769-PB2	1769-PA4	1769-PB4
Description	Compact 124/240V AC Expansion Power Supply	Compact 24V DC Expansion Power Supply	Compact 124/240V AC Expansion Power Supply	Compact 24V DC Expansion Power Supply
Operating Voltage Range	85...265V AC (wide range; no jumper or DIP switch required), 47...63 Hz	19.2...31.2V DC	85...132V AC or 170...265V AC (switch selectable), 47...63 Hz	19.2...32V DC
Power Consumption, Max.	100 VA @ 120V AC 130 VA @ 240V AC	50 VA @ 24V DC	200 VA @ 120V AC 240 VA @ 240V AC	100 VA @ 24V DC
Current Capacity (Amps) at 5V	2.0 A★		4.0 A✱	
Current Capacity (Amps) at 24V	0.8 A‡		2.0 A§	
24V DC User Power Capacity (0° to 55°C)	250 mA	—	—	—
Inrush Current, Max.	25 A @ 132V AC 10 Ω source impedance 40 A @ 265V AC 10 Ω source impedance	30 A @ 31.2V DC	25 A @ 132V AC 10 Ω source impedance 40 A @ 265V AC 10 Ω source impedance	30 A @ 31.2V DC
Line Loss Ride Through	10 ms...10 s		5 ms...10 s	
Short Circuit Protection (Yes/No)	Front Access Fuse (replacement part number: Wickmann 19195-3.15A, Wickmann 19343-1.6A, or Wickmann 19181-4A)	Front Access Fuse (replacement part number: Wickmann 19193-6.3A)	Front Access Fuse (replacement part number: Wickmann 19195-3.15A or Wickmann 19181-4A)	Front Access Fuse (replacement part number: Wickmann 19193-6.3A)
Overvoltage Protection	For both +5V DC and for +24V DC			
Isolation Voltage	Verify by one of the following tests: 1836V AC for 1s or 2596V DC for 1s 265V Working Voltage (IEC Class 1 - grounding required)	Verify by one of the following tests: 1200V AC for 1s or 1697V DC for 1s 75V Working Voltage (IEC Class 1 - grounding required)	Verify by one of the following tests: 1836V AC for 1s or 2596V DC for 1s 265V Working Voltage (IEC Class 1 - grounding required)	Verify by one of the following tests: 1200V AC for 1s or 1697V DC for 1s 75V Working Voltage (IEC Class 1 - grounding required)
Power Supply Distance Rating	8 modules▲ ➤			

★2000 mA @ 5V (0...55 °C)
 2000 mA @ 5V (55...60 °C)
 ✱4000 mA @ 5V (0...55 °C)
 4000 mA @ 5V (55...60 °C)
 ‡800 mA @ 24V (0...55 °C)
 800 mA @ 24V (55...60 °C)
 §2000 mA @ 24V (0...55 °C)
 1700 mA @ 24V (55...60 °C)

▲ Up to 8 I/O modules can be connected on either side of the power supply for a maximum of 16 modules.

➤ When configuring your system using a MicroLogix 1500 controller, only one expansion cable, one expansion power supply, and a total of 8 I/O modules may be used in a maximum of two banks of I/O modules. The expansion power supply cannot be directly connected to the MicroLogix 1500 controller.

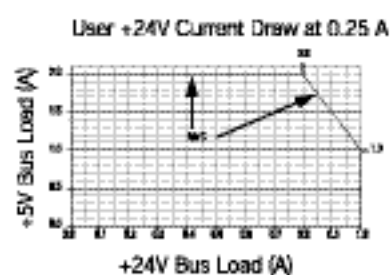
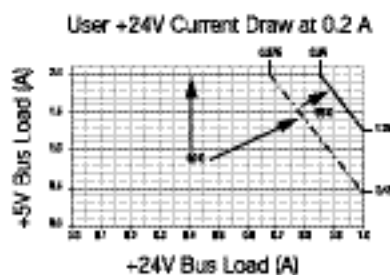
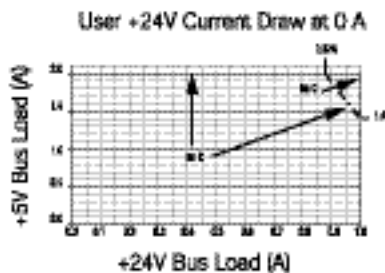
Certifications: UL 508, CSA (Class I, Division 2, Group A, B, C, D), CE

Consider these guidelines for system expansion using power supplies and cables:

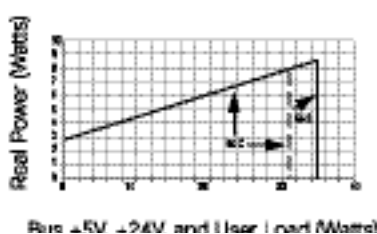
- Expansion power supplies must be used with the expansion cables.
- Only one power supply may be used on an I/O bank, with a maximum of 16 modules per bank.
- Using an expansion power supply on the same I/O bank as your MicroLogix 1500 controller or two expansion power supplies on the same bank may damage a power supply and may result in unexpected I/O operation.

Power Requirements and Transformer Sizing

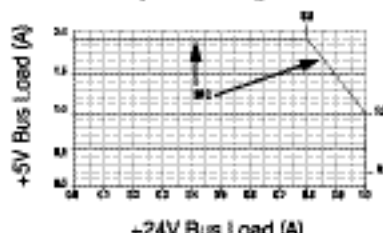
1769-PA2 Output Derating



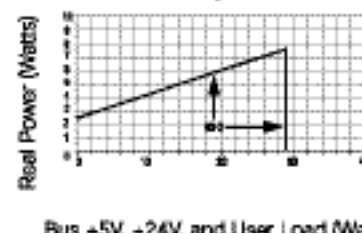
1769-PA2 Power Dissipation



1769-PB2 Output Derating

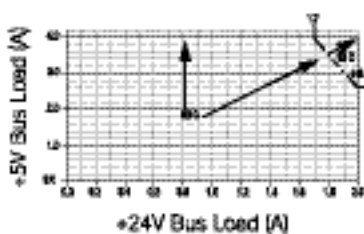


1769-PB2 Power Dissipation



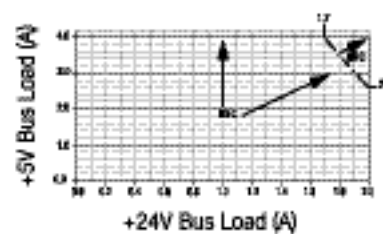
1769-PA4 Output Derating

Total Output: 88W @ 55°C or below
81W @ 60°C or below

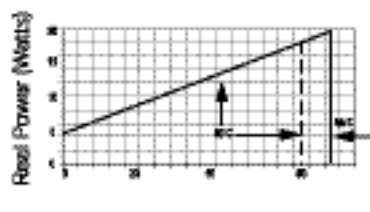


1769-PB4 Output Derating

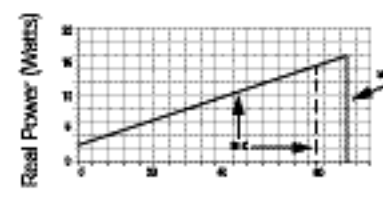
Total Output: 88W @ 55°C or below
81W @ 60°C or below



1769-PA4 Power Dissipation



1769-PB4 Power Dissipation



Validating System Power

After you calculate the current consumed by your system, use the graphs on page 91 to verify that your power supply has adequate capacity for its bank of I/O modules. Compare the graphs to your calculated totals for the following:

- Total 5V DC
- Total 24V DC
- Total 24V DC sensor power (1769-PA2 only)

If your power supply load is at or near the limits of the allowable ranges shown in the graphs on page 91, you must add an additional I/O bank.

Important: The additional I/O bank must include a power supply. An end cap/terminator (1769-ECR or 1769-ECL) must also be used if the I/O bank is the last in the system.

Calculate System Power Requirements

Compact I/O power supplies distribute power from either side of the power supply. For example, a 2 A at 5V DC power supply (1769-PA2, 1769-PB2) can provide 1 A to the right side of the power supply and 1 A to the left. A 4 A at 5V DC power supply (1769-PA4, 1769-PB4) can provide 2 A to the right side of the power supply and 2 A to the left.

Cat. No.	Number of Modules	Module Current Requirements (mA)		Calculated Current (mA) = (number of modules) x (module current requirements)	
		5V DC	24V DC	5V DC	24V DC
1769-ARM		60 mA	0 mA		
1769-ASCI		425 mA	0 mA		
1769-HSC		425 mA	0 mA		
1769-IA8I		90 mA§	0 mA		
1769-IA16		115 mA	0 mA		
1769-IF4		105 mA	60 mA♣		
1769-IF4I		145 mA	125 mA		
1769-IF4XOF2		120 mA	160 mA		
1769-IF8		120 mA	70 mA		
1769-IF16C		190 mA	70 mA		
1769-IF16V		190 mA	70 mA		
1769-IMI2		100 mA	0 mA		
1769-IG16		120 mA	0 mA		
1769-IQ16		115 mA	0 mA		
1769-IQ16F		110 mA	0 mA		
1769-IQ32		170 mA	0 mA		
1769-IQ32T		170 mA	0 mA		
1769-IQ6XOW4		105 mA	50 mA		
1769-IR6		100	45		
1769-IT6		100	40		
1769-OA8		145 mA	0 mA		
1769-OA16		225 mA	0 mA		
1769-OB8		145 mA	0 mA		
1769-OB16		200 mA	0 mA		
1769-OB16P		160 mA▶	0 mA		
1769-OG16		200 mA	0 mA		
1769-OB32		300 mA	0 mA		
1769-BOOLEAN		220 mA	0 mA		
1769-OF2		120	120 ♣		
1769-OF4CI		145 mA	140 mA		
1769-OF4VI		145 mA	75 mA		
1769-OF8C		145 mA	160 mA♣		
1769-OF8V		145 mA	125 mA♣		
1769-OV16		200 mA	0 mA		
1769-OV32T		200 mA	0 mA		
1769-OW8		125 mA	100 mA		
1769-OW8I		125 mA	100 mA		
1769-OW16		205 mA	180 mA		
1769-L35E		660 mA	90 mA		
1769-L35CR		680 mA	40 mA		
1769-L32E		660 mA	90 mA		
1769-L32C		680 mA	40 mA		
1769-L31		330 mA	40 mA		
1769-ADN		450 mA	0 mA		
1769-SDN		440	0 mA		
1769-ECL★		5 mA	0 mA		
1769-ECR★		5 mA	0 mA		
Total Current Required:⊗					

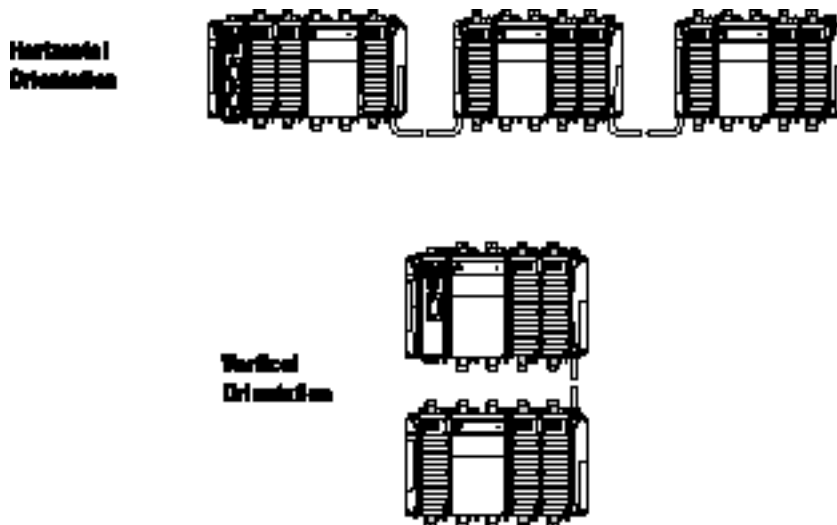
★One 1769-ECL or 1769-ECR end cap/terminator is required in the system. The end cap/terminator used is dependent on your configuration.

⊗The total current required must not exceed the power supply capacity listed below.

♣If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

▶200 mA max.

Mounting a Compact I/O System



You can panel mount or DIN rail mount a CompactLogix system. The CompactLogix system must be mounted so that the modules are horizontal to each other.

If you separate modules into multiple banks, the banks can be vertical or horizontal to each other.

Ground the System

You can ground a Compact I/O system through the:

- non-coated, steel DIN rail.
- panel-mount screw hole containing the ground strap.

Divide I/O Modules into Separate Banks

If you divide the modules into multiple banks:

- the controller or adapter must be in the leftmost position of the first bank.
- each bank needs its own power supply.
- use expansion cables to connect the banks.
- the last I/O bank requires an end cap.

If you add a	And connect the chassis from	Use this cable*
Second bank	Right to left	1769-CRLx
	Right to right	1769-CRRx
Third bank	Right to left	1769-CRLx
	Right to right	1769-CRRx
	Left to left	1769-CLLx

*Where x = 1 for 1 ft. (305 mm) or 3 for 3.28 ft. (1 m)

Add End Caps

The controller or adapter is the leftmost module in the Compact I/O system. The controller or adapter has built-in termination, so the leftmost end of the system is terminated.

The final I/O bank in the Compact I/O system needs an end cap on the end without the expansion cable.

For a	Order
Right end cap	1769-ECR
Left end cap	1769-ECL

Power Supply Distance Rating

Modules can be placed to the left and the right of the power supply. As many as eight I/O modules can be placed on each side of the power supply.

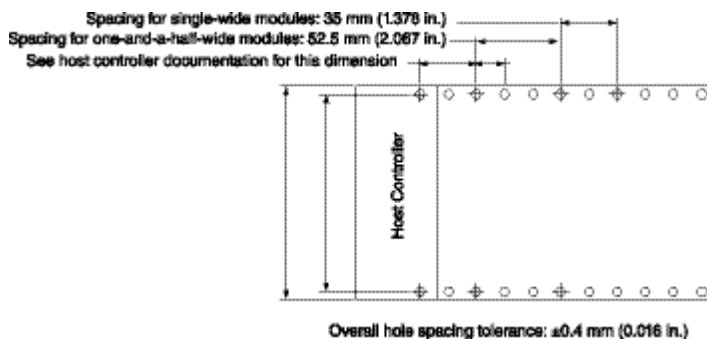
Each 1769 module also has a power supply distance rating (the number of modules from the power supply). Each module must be located within its distance rating. See the specifications for the module to determine its distance rating.

The CompactLogix controller has a power supply distance rating of four modules. The controller must be the leftmost module in the first bank of the system. The maximum configuration for the first bank of a CompactLogix controller is the controller and three I/O modules to the left of the power supply and eight I/O modules to the right of the power supply.

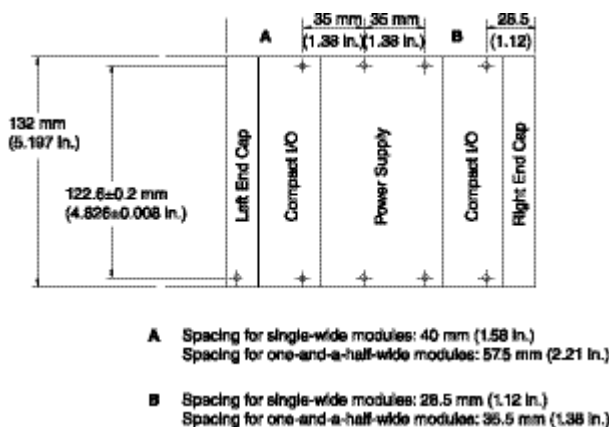
Mounting Dimensions

You can mount the 1769 Compact I/O system with a dimensional template.

Panel Mounting with the Dimensional Template



Compact I/O System with Expansion Power Supply and End Caps



Notes

ControlLogix, POINT I/O, FLEX I/O, FLEX Ex, FLEXArmor, Compact I/O, Logix5550, FlexLogix, CompactLogix, DriveLogix, ProcessLogix, PowerFlex, SoftLogix5800, MicroLogix 1500, PLC-5, PLC-3, PLC-2, SLC, Data Highway Plus, Allen-Bradley, Rockwell Automation, RSLogix, RSLogix 5000 Enterprise, RSLogix 500, RSLinx, PanelConnect, CompactFlash, RSNetWorx, and Rockwell Software are trademarks of Rockwell Automation, Inc. Trademarks not belonging to Rockwell Automation are property of their respective companies.

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